DIVISION 200 - EARTHWORK AND ROADSIDE DEVELOPMENT

SECTION 201 - CLEARING AND GRUBBING

201.01--Description. This work consists of clearing, grubbing, removing and disposing of all items and objects within the limits of the rights-of-way, easement areas or areas shown on the plans or in the contract documents which are not designated to remain or to be removed in accordance with other provisions of the contract. This work shall also include the preservation of all vegetation, objects or materials designated to remain or to be salvaged, and the removal and satisfactory disposal of obstructions and salvable material when their removal and disposal is not otherwise provided in the contract. The requirements for removal and disposal shall be in accordance with the provisions and requirements of Subsections 104.05 and 107.25, and Section 202.

When the contract proposal does not include an item of clearing and grubbing, the necessary work shall be performed in accordance with this section and will be considered as a subsidiary obligation of the Contractor under other contract items.

201.02--Blank.

201.03--Construction Requirements.

201.03.1--Clearing and Grubbing.

201.03.1.1--General. The Engineer will establish rights-of-way, easements, construction lines and designate all trees, shrubs, plants and items to remain.

It is the intent of these specifications that desirable natural growth within the rights-of-way and easements be preserved where practicable. Undesirable growth and other things which detract from the aesthetic value of the completed work or interfere with construction or future maintenance shall be removed. In areas where desirable natural growth is designated to remain, the Contractor shall thin or trim shrubbery and live trees to the extent consistent with the intent of these specifications. Use of methods or equipment which might mar or destroy vegetation designated to remain will not be permitted.

It shall be the responsibility of the Contractor to consider all rights-of-way agreements with the property owners regarding merchantable timber prior to submitting a bid. Merchantable timber conveyed to the State and required to be removed will become the property of the Contractor unless specifically designated otherwise in the contract documents.

All clearing and grubbing necessary for setting construction stakes shall be completed a satisfactory distance ahead of the grading operations.

201.03.1.2--Clearing and Grubbing. Surface objects, trees, stumps, roots and other protruding or underground obstructions, not designated to remain, shall be cleared and grubbed, including mowing, as required. Undisturbed stumps shall be cut off no more than six inches above the ground line or water level. Undisturbed stumps and non-perishable solid objects which will be a minimum of three feet below subgrade or slope of embankment may be left in place when authorized by the Engineer. Stumps and non-perishable solid objects in swampy or wooded areas where mowing is not anticipated may be authorized to remain, provided they do not extend more than six inches above the ground line or low water level.

The Engineer may also permit sound stumps to remain outside the construction limits where mowing is anticipated provided they are cut off flush with or below the surface of the final ground line.

Except in areas to be excavated, stump holes and other holes from which obstructions are removed shall be backfilled with suitable material and compacted to the satisfaction of the Engineer.

All operations shall be conducted in such a manner as to prevent damage to adjacent property and items that are to remain on the right-of-way.

Burning shall be in accordance with the requirements of Subsection 107.22.2.

If not burned, materials and debris shall be removed from the right-of-way and disposed of outside the limits of view from any public road or facility. Locations for disposal shall be obtained by the Contractor in accordance with Subsection 104.05.

Low hanging tree branches which will interfere with maintenance of the roadside shall be removed, and unsound or unsightly branches on trees or shrubs designated to remain shall be removed as directed. Branches of trees extending over the roadway shall be trimmed to give a clear height of at least 20 feet above the roadway surface. All trimming shall be done by skilled workmen and in accordance with good tree surgery practices. An asphalt base paint or sealer prepared specifically for tree surgery shall be applied to cut or scarred surfaces of trees and shrubs.

201.03.1.3--Clearing and Grubbing of Bridge Sites. When separate and concurrent grading and bridge contracts are to be in progress between the termini of construction, clearing and grubbing of the bridge site shall be the responsibility of the grading Contractor, unless the bridge contract contains a bid item for clearing and grubbing.

When there is not a coincidental grading contract or a bid item for clearing and grubbing in the bridge contract, clearing and grubbing of the bridge sites shall be

considered incidental to and included in the price bid for the bridge items.

201.03.2--Random Clearing and Grubbing, and Random Clearing. This work consists of random clearing and grubbing areas designated on the plans or in the contract documents. Random clearing and grubbing will be performed in the designated areas in accordance with the requirements of Subsection 201.03.1.

Random clearing will consist of removing all things such as trees and scrubs within areas shown on the plans or in the contract documents where grubbing is not needed. Examples of such areas may be limits of fencing, site flares, safety zones, etc.

When random clearing is required in areas such as safety/clear zones, cutting shall be approximately flush with the ground. Grubbing will not be permitted in these areas. Stumps are to be cut approximately flush with the ground, but in no case shall stumps extend more than two inches above the ground line. This work also includes the removal and proper disposal of the cut material off of the right-of-way, or it may be chipped or shredded by mechanical means and mulched on the right-of-way to the satisfaction of the Engineer. Material and debris which is removed from the right-of-way shall be disposed of outside of limits of view from any public road, street, park or other such public facility at locations obtained by the Contractor in accordance with Subsection 104.05 and Section 202.

201.04--Method of Measurement. Any mowing required as a part of the clearing and grubbing, random clearing and grubbing, or random clearing operations will not be measured for payment.

Unless otherwise noted, clearing and grubbing, random clearing and grubbing, or random clearing will be measured as follows.

201.04.1--Lump Sum Basis. The area included under this item will be the entire area within the right-of-way lines shown on the plans. No measurement will be made except when the area of the right-of-way is increased or decreased from that shown on the plans at the time bids are received. In this case, the lump sum contract price will be adjusted in the same ratio that the area of the right-of-way is increased or decreased.

201.04.2--Area Basis. The area included under this item will be measured in acres. Measurement will only be made for the area(s) actually cleared or cleared and grubbed and will not include areas for which payment is made under another item. The clearing of grass, weeds, roots, farm crops, and scattered small bushes will not be measured for payment.

Areas acquired for haul routes, or areas acquired for Contractor use will not be measured for payment, unless noted otherwise in the contract.

201.04.3--Station Basis. The designated areas of random clearing will be measured per station in accordance with the typical sections shown on the plans. This shall apply to the right or left sides of each separate roadway. Separate measurement shall be made for random clearing required and satisfactorily completed on the right or left sides of each separate roadway.

201.05--Basis of Payment. Clearing and grubbing, random clearing and grubbing, or random clearing, measured a prescribed above, will be paid for at the unit price bid as follows.

201.05.1--Lump Sum Basis. The work under this item will be paid for at the contract lump sum price or adjusted lump sum price in accordance with the above provisions which shall be full compensation for completing the work.

201.05.2--Area Basis. The work under this item, measured as prescribed above, will be paid for at the contract unit price per acre which shall be full compensation for completing the work.

201.05.3--Station Basis. The work under this item, measured as prescribed above, will be paid for at the contract unit price per station which shall be full compensation for completing the work.

The price for clearing and grubbing, or random clearing, shall include the cost of continuous maintenance of traffic and protective services as required by the Traffic Control Plan included in the contract. This shall include all required individual traffic control.

Payment will be made under:

201-A: Clearing and Grubbing	- lump sum
201-B: Clearing and Grubbing	- per acre
201-C: Random Clearing and Grubbing	- per acre
201-D: Random Clearing	- per station or acre

SECTION 202 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS

202.01--Description. This work consists of the removal and satisfactory disposal of all buildings, fences, structures, old pavements, abandoned pipe lines and other obstructions which are not designated to remain or to be removed and disposed of under other provisions of the contract or under separate contracts or agreements as referenced in Subsection 104.05. This work also consists of

necessary excavation incidental to the removal of structures and obstructions and backfilling the resulting cavity.

202.02--Blank.

202.03--Construction Requirements.

202.03.1--General. The Contractor shall preserve and protect all structures, fences, public and private utilities and improvements, above or below the ground, which are to remain or be removed by others as set out in Subsection 104.05. Unless specified, removal or adjustment of these items will not be the responsibility of the Contractor. However, the Contractor shall arrange and conduct operations to conform to the requirements set out in Subsections 105.06 and 105.07.

The Contractor shall raze or remove and satisfactorily dispose of all buildings, structures, fences and other obstructions except those items indicated to remain or be otherwise removed and disposed of under other provisions. Basements or cavities left by structure removal shall be filled to the level of the surrounding ground, compacted as directed, or if within the limits of construction, compacted in accordance with Subsection 203.03.

All materials not designated for salvage shall be disposed of by the Contractor in accordance with Subsections 201.03.2 and 104.05.

The use of explosives is not permitted unless approved by the Engineer. Blasting, if permitted, or other operations necessary for the removal of an existing structure or other obstruction which may damage new construction shall be completed prior to constructing the new work. The Contractor shall employ methods of removal that will ensure new work, items to remain or materials to be salvaged will not be damaged. Reference is made to Subsections 107.11 and 107.12 regarding this work.

202.03.2--Salvage. All material designated for salvage shall be removed, without unnecessary damage, in sections or pieces which may be readily transported. The material shall be stored by the Contractor at designated sites within the project limits or at special locations as designated in the contract.

202.03.3--Removal of Bridges, Culverts and Other Structures. Bridges, culverts and other structures that are in use shall not be removed until the traffic is satisfactorily accommodated.

Unless otherwise directed, existing structures shall be removed to at least one foot below the final ground line or mudline. The removal of a bridge located in a navigable stream shall be subject to the requirements set out in the permit authorizing construction of the new structure.

Unless designated on the plans or in the contract documents to be removed and salvaged, all structural steel, timber and other bridge materials shall become the property of the Contractor. It shall be removed from the site before completion of the work and proper allowance for its value shall be taken into account in the bid price of the item involved. If the structure is to remain the property of the State, steel or timber bridges shall be carefully dismantled without unnecessary damage. Steel members shall be match marked and all salvaged material shall be stored as specified in Subsection 202.03.2.

When required on the plans or in the proposal, concrete which is suitable for riprap shall be salvaged and stockpiled or otherwise disposed of in accordance with Subsection 202.03.5.

All removals shall be in accordance with the provisions of Subsection 104.05.

202.03.4--Removal of Pipe. All pipe lines designated to be salvaged or relaid shall be carefully removed and every reasonable precaution taken to avoid breaking or damaging. Pipes designated to be relaid shall be removed and stored when necessary to prevent loss or damage before relaying. The Contractor shall replace without extra compensation all sections lost from storage or damaged by negligence or improper methods to the extent its reuse is deemed by the Engineer to be unsatisfactory. Pipes not designated to be salvaged or relaid shall be disposed of by the Contractor in accordance with Subsections 201.03 and 104.05.

202.03.5--Removal of Pavement, Sidewalks, Curbs, Etc. When required on the plans or in the proposal, concrete pavement, sidewalks, curbs, gutters, etc. designated for salvage shall be broken into pieces not exceeding 150 pounds and stockpiled at locations designated by the Engineer within the project limits or at special locations as designated in the contract. All non-salvaged materials shall be disposed of by the Contractor in accordance with Subsections 201.03 and 104.05.

202.04--Method of Measurement. Removal of Obstructions - lump sum, will include all structures and obstructions encountered within the right-of-way and easement areas except items which are to be measured on a unit basis.

Where the proposal stipulates specific items on a unit basis, measurement will be made by the unit.

The length of pipe removed will be the product of the number of commercial lengths and the nominal laying length.

Traffic stripe removal will be measured by the linear foot from end-to-end of individual stripes. Measurement will be made along the surface of each stripe and will not include nominal skip intervals. Stripes more than six inches in width will be converted to equivalent lengths of six-inch stripe. Legend will be

measured for payment by the square yard. When provisions are not included in the contract for legend removal by the square yard, the removal area will be converted to equivalent lengths of six-inch stripe.

202.05--Basis of Payment. Removal of Obstructions will be paid for at the contract lump sum price which shall be full compensation for removing and disposing of the obstructions in accordance with the provisions of the contract.

Specific obstruction items stipulated for removal and disposal under 202-B will be paid for at the contract unit price which shall be full compensation for completing the work.

Payment will be made under:

202-A: Removal of Obstructions	- lump sum
202-B: Removal of Item	- per each, linear foot, square yard, or cubic yard

SECTION 203 - EXCAVATION AND EMBANKMENT

203.01--Description. This work consists of excavation and embankment required for roadways, ditches, channel changes and borrow material, preparation of subgrades and foundations, construction of embankments and other utilization or disposal of materials excavated, and the compaction and dressing of excavated areas and embankments. This work shall also consist of any required site grading in accordance with the details in the plans and/or as directed by the Engineer. The work of excavation for structures is covered separately under Section 206 and not included under this section.

203.01.1--Unclassified Excavation. Unclassified excavation will consist of all excavation materials of whatever character encountered in the work except for those classes of excavation for which separate pay items are provided.

203.01.2--Rock Excavation. When shown as a pay item, rock excavation will consist of material which cannot be excavated without blasting and shall also include large boulders and detached stones having volumes of one-half cubic yard or more. The use of the words "rock," "boulders," "stone," or synonyms of these words appearing elsewhere on the plans, soil profile or these specifications does not imply that these materials may be included under this classification unless so indicated in the contract proposal.

The Contractor shall immediately notify the Engineer when rock excavation is encountered during the progress of the work so the necessary measurements may

be made for determining the volume removed.

203.01.3--Muck Excavation. Muck excavation will consist of the excavation, removal and disposal of natural deposits of soils and organic matter in accordance with the provisions of Subsection 203.03.7. Muck excavation shall not be identified by visual means but will be sampled and tested, at a frequency determined by the Engineer, to verify its classification. Muck excavation is defined as a saturated soil having an organic content of at least six percent (6%) as determined by Mississippi Test Method MT-29, or AASHTO Designation: T 267.

It is the intent that all areas of muck excavation will be located and defined during the design phase of a project. However, if additional areas of questionable material are found during construction, the material shall be tested to see if it is a saturated soil having an organic content of six percent (6%) or more before it is considered muck. If the material is defined as a muck, based on testing, the method of removal should not be an issue and the material should be paid for as 203-D, Muck Excavation.

Excavated material not meeting the herein established requirements for classification as muck excavation shall be used, measured and paid for under the pay item in which the material is being used.

In extreme cases, in non-organic areas where all efforts to drain the area and/or dry the material have proved unsuccessful, the Project Engineer, in consultation with the District Materials Engineer and District Construction Engineer, shall make the determination as to whether the material will be classified as muck excavation or unclassified excavation.

Removal of muck excavation shall be in accordance with the requirements of Subsection 104.05.

203.01.4--Borrow Excavation. Borrow excavation will consist of approved material required for the construction of embankments or other portions of the work and shall be obtained from approved sources outside the right-of-way except as provided in Subsection 203.03.3. Unless otherwise provided in the contract, the Contractor shall make arrangements for obtaining borrow and pay all costs involved. Contractor-furnished borrow shall meet the requirements of Subsections 106.02.2 and 703.21.

203.01.5--Channel Excavation. When shown as a pay item, channel excavation will consist of excavation and disposal of all material from widening, deepening or straightening of an existing channel, or construction of a new channel. The Contractor shall furnish a disposal area unless otherwise provided in the contract. Material designated as channel excavation and used in the roadbed or other required embankment construction will be measured for payment as channel

excavation only.

203.01.6--Excess Excavation. When shown as a pay item, excess excavation will consist of excavation which cannot be satisfactorily used or disposed of within the right-of-way. Exclusive of muck excavation, excess excavation may include any type, kind, or class of excavation which the Engineer determines must be removed from the right-of-way. It will not include any excess caused by the Contractor importing too much excavation from sources outside the roadway structure; in such case, the excess excavation shall be removed from the right-of-way without cost to the State.

Unless otherwise indicated in the contract, the Contractor shall provide a disposal area for excess excavation.

Removal of excess excavation shall be in accordance with the requirements of Subsection 104.05.

203.01.7--Surplus Excavation. When shown as a pay item, surplus excavation will consist of excavation within the right-of-way which is in excess or unsuitable for embankments but can be satisfactorily used or disposed of within the right-of-way.

203.02--Blank.

203.03--Construction Requirements.

203.03.1--General. Excavation and embankment operations may be started at the location and in the sequence approved by the Engineer when:

(a) sufficient clearing and grubbing has been completed and accepted;

(b) the work has been cross sectioned and slope staked;

(c) installation of required pipes, culverts, and approved backfills are complete;

(d) the site has been prepared in accordance with these specifications and

(e) the Contractor is aware of proper methods of haul and disposal of material.

Excavations and embankments shall be finished to reasonably smooth and uniform surfaces. No material shall be wasted without permission of the Engineer. Excavation operations shall be conducted in a manner that material outside the construction limits will not be unnecessarily disturbed.

Where plating with topsoil is contemplated, either in cut or fill sections, appropriate adjustment shall be made in the graded section during construction so that the finished section after plating will conform to the typical sections shown on the plans.

Unless otherwise specified, rock larger than three inches shall be removed from the roadbed to a minimum depth of eight inches below subgrade and backfilled with material designated on the plans or approved by the Engineer. Care shall be taken that undrained pockets are not left in the surface of rock. Rock removed more than 12 inches below subgrade will not be measured for payment and backfilling in excess of 12 inches will be at the expense of the Contractor. Removal of boulders and subsequent backfilling are excluded from the 12-inch limitation.

Borrow material should not be placed until excavation from the roadway has been utilized as shown on the plans. Excess material determined to have been caused by the Contractor importing too much excavation from sources outside the roadway shall be removed from the right-of-way in accordance with Subsection 104.05 unless permission is given by the Engineer that the material may be disposed of within the right-of-way. In either case, the volume of excess material will be measured by the method deemed most appropriate by the Engineer under the provisions of Subsection 109.01 and deducted from measured quantities. The Contractor shall not excavate beyond the dimensions and elevations established or approved, and no material shall be moved prior to the staking out and cross-sectioning of the site.

If borrow material is to be measured for payment in its original position (FM), the finished borrow areas shall be left in a condition suitable to accurately measure the material used.

Additional requirements shall be those applicable conditions governing the use of local materials as set out in Section 106.

Obliteration of old roadways shall include all operations necessary to incorporate the old roadway into the new roadway or into the surrounding right-of-way in a way that will provide a pleasing appearance from the new roadway. Unless other pay items are provided, roadway obliteration will be paid for as unclassified excavation.

When excavating operations encounter the remains of prehistoric dwelling sites or other artifacts of historical or archeological significance, the operations shall be temporarily discontinued. The Engineer will contact appropriate authorities to determine their significance and appropriate disposition. When directed by the Engineer, the Contractor shall excavate the site in a manner to preserve the artifacts encountered, or aid in the determination of significance and disposition, and when ordered, shall remove them for delivery to the custody of the proper

State authorities. Such excavation and removal will be considered and paid for as Extra Work.

Where excavation to grade results in a foundation, subgrade, or slope of unsuitable soil, the Engineer may require the Contractor to remove unsuitable materials and backfill to the required grade with approved material. Slides or other soil failures shall be removed by the Contractor unless their removal is waived by the Engineer. The Contractor shall conduct operations in such a way that the Engineer can take the necessary cross sections before backfill is placed.

The Engineer may designate as unsuitable those soils which, at the proper moisture content, cannot be processed to the required density and stability. All unsuitable material shall be disposed of as specified or directed.

When the Engineer orders or the contract requires excavation to be handled more than one time prior to final placement, such as topsoil to be stockpiled and reserved for later use, payment will be made at the contract unit price for the class excavation involved for each handling approved by the Engineer, or it will be paid as another item of work for the final handling when so specified.

203.03.2--Topsoil. Where the salvaging and stockpiling of topsoil is specified, this operation shall be completed before beginning excavation of the underlying material.

203.03.3--Borrow Excavation from Within the Right-of-Way. When the contract indicates borrow excavation to be paid for as final measure-embankment (FME), the plans may also identify certain estimated excavation volumes by the symbol ESFE (Estimated State Furnished Excavation). Suitable quantities of ESFE may be used by the Contractor without charge in the construction of embankments to be measured FME.

Quantities of ESFE shown on the plans are for the Contractor's information only and may vary or may be varied by the Engineer. The change in quantity shall not be cause for additional compensation.

Excavation designated as ESFE is required to be performed and will not be measured in its original position. ESFE suitable for use in embankment or other features of the work shall be used and will be included in measured quantities of borrow excavation (FME). Any materials indicated as ESFE which are found to be unsuitable shall be removed and disposed of as provided elsewhere in the contract.

203.03.4--Construction of Bridge Approaches. The construction of "spill through" embankments and approaches shall be the responsibility of the grading Contractor. The existence of a separate contract awarded for bridge construction will not alter this responsibility.

The grading Contractor shall construct the bridge approaches to subgrade elevation and extending a minimum of 100 feet from each bridge end as soon as practicable. All bridge end slopes shall be finished to the lines and grades specified except the allowable tolerance for initial construction of bridge end slopes to be paved is plus six inches.

The bridge Contractor shall drive the piling through the fill, complete the end bents, end spans, and slope paving as soon as practicable after the bridge end fills have been placed in order that the grading may be completed by the grading Contractor. The bridge Contractor is responsible for the final shaping of the "spillthrough" embankment for placement of slope paving or riprap.

203.03.5--Excavation Operations. Excavation operations shall be so conducted as to minimize the loosening of materials outside the required slopes or below the indicated grade. No payment will be made for the removal, disposal or replacement of material determined to be loosened or undercut through carelessness or negligence on the part of the Contractor. Neither will payment be made for excavation which is used for purposes other than designated except as provided in Subsection 104.06.

When practicable, excavation and disposal of the material shall be conducted in such a manner that the most suitable material will be placed in the top courses of embankments. Also, adequate drainage which will conform to the finished drainage system shall be maintained.

All earth cut slopes shall be dressed to smooth and uniform surfaces to conform to the specified sections. The allowable horizontal tolerance at subgrade elevation will be five-tenths of a foot. The allowable tolerance from staked cut slopes will be plus or minus five tenths of a foot horizontally for each 10 feet of depth. Allowable vertical tolerances at subgrade elevation shall be in accordance with the tolerances set out in Section 321.

Care shall be taken to avoid overshooting of material when blasting. All rock cut slopes shall be left with a reasonably uniform surface, and all loose, shattered or overhanging rock shall be removed.

203.03.6--Muck Excavation. The depth and width of muck excavation will normally be shown on the plans. The excavation and subsequent basement soil formation shall be completed as soon as practicable in order to obtain maximum consolidation prior to final shaping of the subgrade and subsequent construction of the pavement structure. When directed by the Engineer, other unsatisfactory foundation material beneath or immediately adjacent to the muck shall be removed and disposed of as muck excavation.

Excavation of muck shall proceed ahead of backfilling or embankment operations for the full width and depth shown on the plans or as directed.

Placing of embankment material in the excavated area by backdumping may be permitted when the Engineer determines this method of placement to be satisfactory. In this case, placement shall immediately follow the muck removal, and where deemed desirable, the fill shall be constructed forward in a wedge shape with as much of a surcharge above grade as practicable to afford maximum displacement of the remaining muck. Pressure developed on the advancing toe of the embankment by the displaced muck shall be relieved by excavating and removing the muck. Otherwise, embankment construction shall be performed in accordance with the provisions of Subsection 203.03.8.

The Contractor shall take necessary precautions to insure that stream channels and drainage ditches will not be filled by movement of muck. Displaced materials adjacent to the roadway shall be leveled or disposed of as specified. In any case, the material shall be left in such a manner that it will not present an unsatisfactory appearance, interfere with essential drainage or prevent proper embankment formation.

203.03.7--Disposal of Unsuitable, Surplus, Channel and Excess Excavation. All material encountered in excavation within the right-of-way which is unsuitable for use in the work shall be removed and disposed of as specified in the contract or as directed. Unsuitable material shall be understood to be any material which, at the proper moisture content, cannot be processed to the required density and stability.

The Contractor will be paid for unsuitable material ordered excavated and disposed of and the required backfill material at the respective contract prices except when the unsuitable material was placed under the contract.

Unless otherwise specified, the Contractor shall provide at no additional costs to the State the location for the disposal of muck and excess excavation and shall furnish the Engineer with two signed copies of the release as provided in Subsection 104.05. Removal of muck and excess excavation shall be in accordance with the requirements of Subsection 104.05.

Surplus excavation as defined in Subsection 203.01.7 shall be used for widening of embankments, flattening slopes or at other locations within the right-of-way for the purpose indicated. If there is more surplus excavation than can be effectively used within the right-of-way, the Engineer may reclassify the excavation as excess excavation as defined in Subsection 203.01.6 when the contract contains a bid item for excess excavation or order its disposal as extra work.

Unless specified for use in embankments, channel excavation may be used to fill old channels when so designated on the plans and to fill washes and gullies or wasted as directed by the Engineer. It shall be spread and leveled or otherwise shaped to blend with the adjacent terrain and shall not obstruct drainage, interfere

with the property rights of others or present an unsatisfactory appearance.

203.03.8--Embankment Construction.

203.03.8.1--General. Embankment construction shall consist of constructing roadway embankments, dikes, placing and compacting of approved material where unsuitable material has been removed, backfilling of structures where not otherwise provided for and placing and compacting embankment material in holes, pits or other depressions. This work shall also consist of preparation of the areas upon which embankments are to be constructed. Only approved materials shall be placed in embankments and backfills. Unsuitable or perishable materials such as rubbish, sod, brush, roots, logs, stumps after removal, heavy vegetation, sawdust, etc., shall not be incorporated in embankments. Rocks, broken concrete, or other solid material shall not be placed in embankment areas where piles are to be driven.

Special materials for inundated areas, filter beds, etc., or special backfill may be specified elsewhere in the contract.

203.03.8.2--Preparation of Embankment Areas. Preparation of embankment areas shall be in accordance with one or a combination of the following procedures:

(a) All grade points shall be undercut and backfilled with suitable material as directed by the Engineer and compacted to the density for the design soil portion of embankments. The material excavated from the undercut, if suitable, shall be used in other portions of the work. The undercut at each grade point shall be approximately three feet below subgrade. The undercut shall be extended a sufficient distance into the cut to provide an undercut grade at the point of intersection with the subgrade of not less than three feet below natural ground. Approved undercut will be measured for payment as excavation.

(b) Where an old road surface containing granular materials or surface treatment is less than three feet below subgrade, the old road shall be scarified as directed. The scarified material shall be compacted to the density specified for the design soil portion of the embankment prior to placing additional material.

(c) Unless otherwise specified or directed by the Engineer, all sod, vegetation and unsuitable soil shall be removed from the surface upon which the embankment is to be constructed when the height of the embankment to subgrade will be three feet or less. The cleared surface shall be thoroughly mixed by plowing, scarifying or disk-harrowing to a depth of at least six inches. The area shall then be compacted to the density specified for the design soil portion of the embankment.

The removed vegetation and unsuitable soil shall be disposed of as directed. No measurement for payment will be made unless the Engineer requires that the material be loaded and hauled for use or disposal in another area. In this case, measurement for payment will be made as provided in Subsection 203.04 and haul will be paid as provided in Section 205. No direct payment will be made for the plowing, scarifying or disk-harrowing.

(d) In areas where the height of embankment to subgrade is to be greater than three feet, all material determined by the Engineer to be unsuitable as a foundation of the embankment shall be undercut and disposed of as directed. All sod on other areas shall be thoroughly disk-harrowed before construction of the embankment. Approved undercut will be measured for payment as excavation and haul will be paid as provided for in Section 205. No direct payment will be made for the disk-harrowing.

(e) Where embankment is to be constructed against existing roadway slopes or on hillsides, the slopes which are steeper than 6:1 shall be continuously benched as the new work is constructed on the slope. Benching shall be of sufficient depth and width to permit operation of the construction equipment. Each horizontal cut shall begin at the intersection of the original ground or slope and the vertical side of the previous cut. Suitable material thus cut out shall be recompacted along with the new embankment material and will not be measured for payment.

203.03.8.3--Embankment Formation. After the area has been prepared as specified, the embankment shall be constructed in full-width layers parallel to the finished grade.

Except as herein provided, the non-compacted thickness of each layer shall not exceed eight inches and shall be spread, shaped and compacted to the required density and stability. The completed embankment shall conform to the line, grade, and cross-section.

The required stability in embankment construction shall be that which the Engineer determines can be reasonably obtained at the proper moisture content for the material being placed. Sponginess, shoving or other displacement under heavy equipment will be considered prima facie evidence of the lack of stability.

Direct casting or similar methods will not be permitted unless authorized in writing by the Engineer. When direct casting is authorized, all material shall be moved from the point where it is deposited, spread and compacted in uniform layers as specified herein.

203.03.8.4--Basement Soils. Reference is made to Figure 1 at the end of Subsection 101 regarding basement soils. In low, swampy ground which will not support the weight of hauling equipment, the Engineer may permit the bottom portion of the embankment to be built in a uniformly distributed layer of sufficient thickness to support the construction equipment. However, this method will not be permitted in any portion of the embankment within three feet of the subgrade.

Where the embankment material is from an inconsistent soil deposit, construction shall be performed so as to eliminate pockets or strata of varying materials. Each layer shall be disk-harrowed and heavily bladed for its full depth; or moved from its position of deposit by appropriate equipment; or processed by other means to the extent necessary to eliminate pockets or stratification of the embankment materials. The layer shall then be shaped and compacted in accordance with these specifications.

Rock shall be distributed over the embankment area to avoid bridging, nests or pockets, and all voids shall be completely filled with earth or stone fragments and compacted. Where only occasional boulders are encountered, they shall be placed near the outer slopes in lower portions of the embankment.

Where the excavated material consists predominately of rock fragments of sizes that cannot be placed in layers of the thickness specified without crushing, pulverizing or further breaking down of pieces resulting from excavation methods, the material may be placed in layers not exceeding the thickness of the approximate average size of the rocks, but in no case to exceed three feet. The balance of the embankment shall be composed of suitable material placed in layers not exceeding eight inches in loose thickness and compacted as specified.

203.03.8.5--Design Soils. Reference is made to Figure 1 at the end of Subsection 101 regarding design soils. Each layer of the design soil shall be disk-harrowed and heavily bladed for its full depth, or processed by other approved means to the extent necessary to provide a layer of material reasonably uniform in character. Each layer shall then be shaped and compacted in accordance with these specifications.

203.03.8.6--Backfill and Embankment Formation Adjacent to Structures. Backfilling around structures shall not start until permission has been granted by the Engineer as referenced in Subsection 601.03.6.3. After approval is given to proceed, the work shall be performed under the supervision of the Engineer or the Engineer's designated representative.

Material used shall be suitable material obtained from structure excavation, roadway and drainage excavation or other designated material. The material shall be approved before placement and shall be the best available from the source. It shall preferably be sandy or loamy non-plastic material and free from

large lumps, clods, rock or other objectionable matter. Adequate provision shall be made for thorough drainage of all backfilling.

The backfill material shall be deposited in uniform and parallel layers not to exceed eight inches of loose material on each side of box bridges, culverts or other structures. Each layer shall be processed by approved methods for its full depth and to the extent necessary to provide a layer of material reasonably uniform in character and shall be so placed and compacted that drainage of the layer will be away from both the longitudinal and the transverse axes of the structure. In addition, the backfill for abutments, retaining walls, wing walls or other structures or sections thereof shall be built in layers with each layer being constructed for the full length of the unit and special precaution shall be taken to prevent any wedging action against the structure.

The material for each layer shall be uniformly compacted with approved mechanical equipment or self-powered mechanical tampers to not less than the density required in the adjacent embankment. The work shall be conducted so as to form a berm of compacted soil of sufficient width on each side of the structure. The berm at the top of the structure shall be at least six feet in width. The slopes of the backfill shall not be steeper than 2:1 at any point. Unless otherwise specified, backfilling shall continue as applicable to the level of the original ground or to an elevation at least one foot above the top of the structure or to the top of the graded section when less than one foot of cover is provided.

The work shall be conducted in a manner that the Engineer can make the necessary tests for compaction as the work progresses.

The Contractor shall repair, restore with new work or make good without extra compensation all damage to the structure as a result of the backfilling operation.

Payment for this construction shall be included in the contract unit price for the material with which backfill is made.

203.03.8.7--Compaction of Embankments. All embankment material shall be at the moisture content determined to be proper for the particular material being placed so that the resulting work will be both dense and stable.

It shall be the Contractor's responsibility to maintain the proper moisture content during compaction operations and the Engineer may require additional moisture or drying as necessary without additional compensation.

The material shall be compacted until the required density, determined in accordance with Subsections 700.03 and 700.04 has been attained and the embankment is stable.

Acceptance of compaction will be on a lot basis. A lot size will be based on the

Contractor's hourly production rate as set out in Department's SOP.

For basement and design soils, the required density shall be 95.0 percent and 98.0 percent, respectively. If a density test is within minus two percent (-2.0%), 93.0 to 95.0% or 96.0 to 98.0%, of the required density, a verification test will be performed and the average of the two tests will be the test value for the lot. If this test value does not meet the required density (95.0 or 98.0%), the lot shall be rejected. If the original test value exceeds minus two percent (-2%) of the required density, no verification test will be performed and the lot shall be rejected.

Acceptance of compaction for structural backfill will be considered a separate frame of work. The backfill at each structure up to a depth of five feet will be considered a lot. For long structures, the Engineer may specify that the backfill be divided into smaller lots. Each lot will be divided into four approximately equal sublots with two density tests taken at random on each side of the structure. The single test and the lot average shall conform to the required densities set forth above for basement soils or design soils as applicable.

The Contractor shall make allowance for shrinkage and compaction in the construction of embankment.

203.03.8.8--Tolerances. The tolerances shown below as allowable shall not prevent the work from meeting the requirements of Subsection 105.03.

Allowable vertical tolerances for design soils at subgrade elevation shall be in accordance with the tolerances set out in Section 321.

The allowable horizontal tolerance at subgrade elevation will be five-tenths of a foot. The allowable tolerance from staked slopes on fills will be plus or minus five-tenths of a foot horizontally for each 10 feet of fill height except where surplus excavation is required or permitted by the Engineer for widening embankments or flattening slopes. In these cases tolerances will be modified accordingly.

203.03.9--Site Grading. Site grading shall consist of excavating or shaping foreslopes, backslopes, or areas shown on the plans to the satisfaction of the Engineer. When site grading is performed and the yield of material from shaping the designated area is in excess of the material needed, such material will be removed and disposed of as directed by the Engineer. Payment of removed material will be made at the contract price for the class excavation involved.

Clearing and grubbing, if required, shall be included in the bid item for clearing and grubbing. If no bid item for clearing and grubbing is included in the contract, it shall be included in the contract unit price for site grading.

The equipment used to site grade shall be capable of grading the site to a uniform and smooth surface as directed by the Engineer.

203.03.10--Maintenance of Earthwork. The Contractor shall satisfactorily maintain all portions of the work until release of maintenance by the Engineer as referenced in Subsections 105.14, 105.15, 105.16 and 107.17. The Contractor shall replace, restore or reconstruct without extra compensation all portions, including materials, determined by the Engineer to have been displaced or damaged due to carelessness or negligence. Carelessness or negligence may include, but not be limited to, improperly maintained; inadequate drainage; failure to remove forms or obstructions; failure to properly prosecute and complete work within the specified time; neglecting to establish erosion control items in accordance with the provisions of Subsection 107.22 and Section 210 or other avoidable causes for displacement or damages.

203.04--Method of Measurement. Items of excavation listed in the proposal will be measured as set forth herein, unless otherwise stipulated.

203.04.1--Unclassified, Rock, Muck, Channel, Excess and Surplus Excavation. These items will be measured by the cubic yard final measure (FM) or loose vehicular measure (LVM) in accordance with Subsection 109.01. The unit of measurement for each item will be shown on the proposal bid sheets. Excavation identified as ESFE will not be measured for payment as excavation except as provided herein.

Excavation identified as ESFE which is unsuitable for placement in the designated roadway prism may be used to construct berms, flatten slopes, wasted on the right-of-way or disposed of by the Contractor off the right-of-way as directed by the Engineer and will be measured for payment under Pay Item No. 203-A, Unclassified Excavation. When the contract does not include a bid price for unclassified excavation, the ESFE will be measured for payment under Pay Item No. 203-EX, Borrow Excavation (ESFE) (FM) (AH), per cubic yard at a unit price equal to 75 percent of the contract unit price for contractor furnished borrow excavation.

203.04.2--Borrow Excavation-State Furnished. Borrow excavation will be measured in accordance with Subsection 109.01 by the cubic yard FM, FME or LVM. The unit of measure will be shown on the proposal bid sheets. When measurement is by FME, it will include excavation identified as ESFE which has been incorporated into the embankment.

203.04.3--Borrow Excavation-Contractor Furnished. Contractor furnished borrow will be measured in accordance with Subsection 109.01 by the cubic yard FME or LVM. The unit of measure will be shown on the proposal bid sheets. When measurement is by FME, it will include excavation identified as ESFE which has been incorporated into the embankment.

Undercut required by the Engineer prior to placement of embankment material that is suitable for placement in other furnished portions of the embankment will be measured for payment as contractor borrow excavation.

Undercut that is unsuitable for placement in the designated roadway prism may be used elsewhere and measured for payment as provided in Subsection 203.04.1 for unsuitable material identified as ESFE.

203.04.4--Haul. Haul of excavation, when authorized for payment, will be measured in accordance with Subsection 205.04. Unless otherwise provided, haul will not be measured for channel excavation, muck excavation or contractor furnished borrow excavation. Nor will haul be measured for payment of the other excavation items when the pay item description contains the symbol "AH" for absorbed haul.

203.04.5--Site Grading. Site grading, complete and accepted, will be measured by the acre or square yard. Only areas shown on the plans or directed by the Engineer will be considered for measurement of payment.

203.05--Basis of Payment. Excavation items, measured as prescribed above, will be paid for at the contract unit price per cubic yard, square yard or acre, which price shall be full compensation for completing the work.

Payment will be made under:

203-A: Unclassified Excavation, FM or LVM - per cubic yard

203-B: Rock Excavation, FM or LVM - per cubic yard

203-C: Blank

203-D: Muck Excavation, FM or LVM - per cubic yard

203-E: Borrow Excavation, FM, FME or LVM , Class____ - per cubic yard

203-F: Channel Excavation, FM or LVM - per cubic yard

203-G: Excess Excavation, FM or LVM - per cubic yard

203-H: Surplus Excavation, FM or LVM - per cubic yard

The symbol "AH" may be added to the pay item descriptions as provided in Subsection 203.04.4.

203-I: Site Grading - per square yard or acre

Material Furnished by Contractor:

203-EX: Borrow Excavation, AH, FME or LVM , Class____ - per cubic yard

203-EX: Borrow Excavation, ESFE, FM, AH* - per cubic yard

* This pay item is not to be included on the plans or contract proposal.

SECTION 204--GEOGRID REINFORCEMENT OF EMBANKMENT SLOPES AND SUBGRADES

204.01--Description. This work shall consist of furnishing and installing geogrid for reinforcement of embankment slopes and/or subgrades as shown on the plans and in conformance with these specifications.

204.02--Material Requirements. The geogrid shall meet the requirements of Subsection 714.15.

204.03--Construction Requirements.

204.03.1--Preparation of Design Grade of Geogrid.

204.03.1.1--Preparation of Foundation Soil. An embankment site that is to receive geogrid reinforcement upon the foundation soil shall be cleared and graded to establish a relatively smooth surface. Trees and stumps are to be cut off at the ground line and sawdust or sand placed over these areas to provide a cushion for the geogrid.

204.03.1.2--Preparation of Basement Soils. An embankment that is to receive geogrid reinforcement located within the basement soil portion of the embankment shall be brought up to the proper grade as shown on the plans and compacted to the required density. The surface shall be left rough so as to provide for a good bond with the next embankment lift above the geogrid.

204.03.1.3--Preparation of Design Soils or Subgrades. A design soil or subgrade which is to receive geogrid shall be shaped and compacted to the required density thus providing a smooth finish, free of loose material and sharp objects.

204.03.2--Geogrid Installation. Geogrid shall be placed coincidently with the compacted lift nearest the design elevation shown on the plans. No partial or half-lift thicknesses are required; however, at no time shall the placement elevation deviate by more than one foot from the design grade.

Correct orientation of the geogrid shall be verified by the Engineer.

Geogrid shall be secured in-place to prevent movement while being covered.

204.03.3--Overlaps and Joints.

204.03.3.1--Uniaxial Geogrids. Uniaxial geogrid shall be placed in continuous longitudinal strips in the direction of main reinforcement and adjacent strips do not need to be overlapped. However, if the Contractor is unable to complete a required length with a single continuous length of geogrid, a joint may be made with the Engineer's approval. This joint shall be made for the full width of the strip by interlacing over and under the main reinforcing strands using a solid rod or hollow pipe of similar material and strength. No end joints will be allowed in any two adjacent strips or within 10 feet of the face of the embankment or, in the case of a spill through slope, in front of the abutment. In the event that the length of geogrid reinforcement is greater than the roll length, then end joints will be allowed in adjacent strips, but they cannot be within 75 feet of one another as measured along the length of the strip. Every effort should be make to keep the number of end joints to a minimum and widely spaced throughout the placement area.

204.03.3.2--Biaxial Geogrids. Biaxial geogrids shall be overlapped three (3) feet between adjacent strips and four (4) feet at the ends except where otherwise noted on the plans and/or in the contract documents.

204.03.4--Placement of Fill over Geogrid. Fill placement shall conform to the requirements of Section 203. Extreme care shall be taken to prevent slippage of the geogrid during fill placement. The fill shall be back dumped and spread on the geogrid in uncompacted lifts of at least six (6) inches before equipment is allowed to continuously operate over it. At no time will tracked equipment be allowed to operate directly upon the geogrid. Rubber tired equipment will be allowed to pass over uncovered geogrid at speeds of less than 5 mph as directed by the Engineer. Any geogrid damage caused by fill placement or equipment movement over the geogrid will be uncovered and repaired as directed by the Engineer at no additional cost to the State.

204.04--Method of Measurement. Geogrid of the type specified will be measured by the square yard of surface area covered. Any overwidth of geogrid installed and additional material required for laps or damage repairs will not be measured. No separate payment shall be made for shipping, handling, storage, protection, fabrication, securing pins or installation, the cost of which shall be included in the contract price for geogrid.

204.05--Basis of Payment. Geogrid, measured as prescribed above, will be paid for at the contract unit price per square yard, which price shall be full compensation for furnishing and placing the geogrid, pins, lapping, joints, repairs, maintaining the geogrid until covered, and satisfactorily completing the work.

Payment will be made under:

204-A: Geogrid, Type ____ - per square yard

SECTION 205 - HAUL

205.01--Description. When the contract contains a pay item for haul, it shall consist of transporting excavated material from its original position to its final location in the work. Haul is designated as Haul of Unclassified Excavation and Haul of classified Excavation.

205.02--Blank.

205.03--Blank.

205.04--Method of Measurement. Haul of excavation will be measured for payment only when the bid proposal contains a pay item for haul. The pay item will identify the excavation item for which haul is to be measured.

Haul will be measured on a distance-volume or distance-weight basis. The distance being 100-foot stations measured along the stationed control line of the project, and the volume or weight measured in the same manner as the excavation item.

In computing haul, it will be assumed that excavated material, including structure excavation, will be hauled the minimum distance and placed in the nearest embankment unless otherwise specified or directed. Cross-haul, when specified or directed by the Engineer, will be measured for payment.

Haul will be computed by multiplying the units of excavation by the average distance it is hauled.

When excavation is shown on the plans and in the proposal to be measured FM, computation of haul will be based on balanced final excavation and embankment quantities determined from final cross-sectional measurements.

A balanced section will be considered as being between two points across which no excavation is hauled. A shrinkage factor will be determined for each balanced section to convert each embankment quantity to the excavation quantity required to construct the embankment.

The center of volume for the cut will be the point where the accumulated yardage equals one-half the total excavation, and the center of volume for the embankment will be the point where the accumulated yardage equals one-half the total embankment. Within each balanced section, the average haul will be

computed along the control line of the project as the distance between the center of volume for the excavation in its original position and the center of volume for the corresponding embankment in its final position.

Embankment and excavation will be considered in sections not exceeding approximately 1,000 feet in length. The center of volume of each section will be determined as set out in the previous paragraph and used in determining the average haul distance.

Structure excavation used in construction of embankments will be included in the excavation quantities of each balanced division, and haul thereof will be determined as set out above.

When the plans and proposal provide for haul of excavation measured as plan haul distance (P.H.D.), the final quantity for Haul of Excavation will be adjusted proportionate to the increase or decrease in the total excavation quantity determined from final cross-sectional measurement of accepted work.

205.05--Basis of Payment. Haul of excavation, measured as prescribed above, will be paid for at the contract unit price per station yard, which shall be full compensation for completing the work.

Payment will be made under:

205-A: Haul of Unclassified Excavation, FM or LVM - per station yard

205-B: Haul of Classification Excavation,
FM, FME or LVM - per station yard

205-C: Haul of Classification Excavation,
FM, FME or LVM , PHD - per station yard

SECTION 206 - STRUCTURE EXCAVATION FOR CONDUITS AND MINOR STRUCTURES

206.01--Description. This work consists of the removal of material necessary for the construction of foundations for box culverts, box bridges, pipe culverts and headwalls, and other minor structures when authorized by the section covering their construction. It shall also include all necessary pumping, bailing, drainage, cribbing or sheeting, other foundation work, and the backfilling and proper disposal of all excavated material as directed. Unless otherwise specified, excavation for pipe used as sidedrain will not be measured as structure excavation.

206.02--Blank.

206.03--Construction Requirements.

206.03.1--Excavation. No excavation shall be made until the Engineer has cross sectioned and staked out the work. The Contractor shall exercise care to ensure that the adjacent natural ground is not unnecessarily disturbed or the foundation loosened below the bottom of the footing unless additional excavation is required.

When the plans indicate or the Engineer directs removal of material classified in the contract as muck excavation or special excavation, the undercut shall be made and the area backfilled approximately one foot above the flow line of the structure and compacted to the required density before structure excavation is performed.

Foundation areas shall be excavated to the footing elevations and dimensions shown on the plans or as established. The right is reserved to make adjustments in the location or flow line to provide adequate drainage and to make dimension changes in the footings to obtain a satisfactory foundation.

In addition to the requirements of this subsection, excavation for pipe culverts will be performed in accordance with Subsection 603.03.

Material encountered which is unsuitable for a stable foundation shall be excavated and backfilled as provided in Subsection 203.03.

206.03.2--Backfill. All backfilling shall be in accordance with the requirements and provisions of Subsection 203.03.

When the plans indicate or the Engineer orders removal of unsuitable material or other undercut below the normal grade line to provide a satisfactory foundation and further orders a specified depth of select material that may not be available from within the right-of-way or easement areas, the Contractor shall furnish a suitable backfill material such as sand, gravel, or other similar granular materials.

206.04--Method of Measurement. Structure excavation acceptably performed will be measured as set forth herein.

For structures other than pipe culverts, the area to be included in the measurement of structure excavation will be that area bounded by vertical planes one foot outside of the neat lines of the footing.

For pipe culverts, the vertical planes will be one foot each side of the nominal inside diameter of the pipe or less for tile and pipe underdrains if indicated on the plans. The length to be allowed will be one foot beyond each end of the pipe, except when the pipe is joined to another structure for which payment for structure excavation will be made. In this case, the length will be limited to the

point of intersection of the centerline of the pipe with the boundary of structure excavation of joining structures.

The depth allowed will be that actually removed between the natural ground line or the bottom of the graded section, whichever is lower, and the bottom of the footing or the bottom of the trench in the case of pipe. Measurement will not be made for excavation beyond the neat lines described which are made for the convenience or necessity of the Contractor's operation.

The volume of structure excavation allowed for payment will be the summation of the products of the widths, depths and lengths described.

In case the Engineer orders additional excavation for foundation improvement below the depth indicated herein, this excavation within the designated neat lines will be measured as structure excavation.

Unless otherwise specified, selected backfill material shown on the plans or directed by the Engineer to be produced from an area to be excavated under one of the classes of excavation set out in the contract will be measured and paid for under the applicable item of excavation.

Any special ordered (select) material which is produced from excavation identified on the plans as E.S.F.E. will be measured for payment as contractor furnished select material. Select material ordered or authorized by Engineer to provide a satisfactory foundation for structures and conduit will be measured by the cubic yard (FM). Contractor furnished materials such as sand, gravel, granular materials, timber, etc. for backfilling will be paid at the contract unit price of the material used or as extra work in accordance with Subsection 104.03 when the pay item for select material for undercuts is not set up in the contract.

Haul necessary to supply the selected material, other than Contractor-furnished, will be measured as set out in Section 205.

No measurement will be made for water or other liquids removed.

206.05--Basis of Payment. Structure excavation, measured as prescribed above, will be paid for at the contract unit price per cubic yard which price shall be full compensation for the work.

Special materials and/or methods of strengthening the foundation, ordered by the Engineer, will be paid for at the contract unit price for the material used; or, when no unit price is included in the contract, the work will be paid for as Extra Work in accordance with Subsection 104.03.

Payment will be made under:

206-A: Structure Excavation - per cubic yard

206-B: Select Material for Undercuts, Contractor Furnished, FM - per cubic yard

SECTION 209 - GEOTEXTILE STABILIZATION

209.01--Description. This work consists of furnishing and installing geotextile for stabilization of embankments and subgrades as shown in the plans and in conformance with these specifications.

209.02--Materials. The geotextile and incidental materials for this work shall meet the requirements of Subsection 714.13.

209.03--Construction Requirements. A subgrade which is to receive geotextile shall be shaped and compacted to a smooth finish and free of loose material and sharp objects. An embankment site shall be cleared and graded to establish a relatively smooth surface. Trees and stumps are to be cut off at ground line and sawdust or sand placed over these areas to provide a cushion for the geotextile.

The geotextile shall be placed as smooth as possible and free from tension, stress, folds, wrinkles or creases.

Where more than one layer of geotextile is required, all joints of the bottom layer shall be sewn to develop the required geotextile strength perpendicular to the joint. The top layer and single layer installations of geotextile may be overlapped a minimum of two feet at each joint or sewn.

Geotextiles which weigh less than eight ounces per square yard shall be factory or field sewn with a "J" type seam. Heavier weight geotextiles shall be factory sewn with two parallel bag type seams approximately one-fourth inch apart or field sewn with an additional seam zigzagged across the two parallel seams.

Securing pins with washers shall be inserted along a line through the mid-point of any overlap or sewn seam at intervals required by the Engineer to prevent movement of the geotextile until covered.

The subsequent course of material shall be back-dumped in such a manner as to avoid damage to the underlying geotextile. No equipment will be allowed to operate over the geotextile until it is covered with a layer of material of sufficient thickness to protect the geotextile installation. When the underlying soil is very unstable, the two outer one-third portions of an embankment layer shall be placed approximately 25 feet in advance of the center one-third portion to prevent excessive mudwave movements and damage to the geotextile installation.

The Contractor shall provide equipment necessary for placing the geotextile in the position and location as detailed on the plans.

The geotextile shall be protected from contamination and damage during installation and placement of the specified cover material. Contaminated geotextile shall be replaced, and damaged geotextile shall be repaired or replaced as directed at no cost to the Department.

The geotextile shall be covered with a layer of the specified material within 14 calendar days after placement. Geotextile not covered within this time period shall be removed and replaced at the Contractor's expense.

209.04--Method of Measurement. Geotextile stabilization, placed in accordance with these specifications and as directed by the Engineer, will be measured by the square yard of surface area covered. Any over width of material installed and additional material required for laps or sewing will not be measured.

209.05--Basis of Payment. Geotextile stabilization, measured as prescribed above, will be paid for at the contract unit price per square yard, which price shall be full compensation for furnishing and placing the geotextile, pins, lapping, sewing, maintaining the geotextile until covered, and satisfactorily completing the work.

Payment will be made under:

209-A: Geotextile Stabilization, Type ____, AOS__*__ - per square yard

* When not designated, see 714.13.

SECTION 210 - ROADSIDE DEVELOPMENT

210.01--General Provisions. Where the term "plant establishment" is used, it shall be understood to mean the work and time necessary to provide fully established, healthy vegetation.

Where the term "dormant" is used, it shall be understood to mean the temporary inactive stage of a living plant or seed. When the term "dormant season" is used, it shall be understood to mean a period of time during the year when germination and growth is not expected. It shall be further understood that the limits of the dormant season for each kind of plant shall be determined by the State Roadside Development Manager or authorized representative.

Planting and establishment of vegetation shall be performed at the earliest practicable time consistent with other operations to provide that the maximum

permanent or temporary vegetation is established as quickly as possible.

The Contractor shall schedule work so finishing of all areas requiring vegetation can begin as soon as practicable behind the controlling item of work. Finishing of such areas and the planting shall progress at the same rate as the controlling item of work. The Contractor shall perform plant establishment throughout the life of the contract.

The Contractor, upon written notification by the Engineer of noncompliance with the preceding two paragraphs, will have 48 hours, excluding Sunday, to correct the situation and comply with the specifications.

Upon failure of the Contractor to comply with the written notification, the Engineer will suspend any or all operations in progress as deemed necessary to insure compliance and may deduct from all subsequent estimates an amount equal to 30 percent of the value of all erosion control items completed between the suspension date and subsequent date of compliance. By execution of the contract, the Contractor agrees that such deduction will not be made as a penalty but as agreed reduction in pay for deficient performance by having failed to provide the Department with the maximum possible ground cover as intended under the contract.

On areas which planting, plant establishment, and maintenance have been performed in accordance with the requirements of the contract the requirements for growth and coverage for each kind of plant which is in its dormant season may be waived provided at least one of the kind of the plantings which is not in its dormant season shows satisfactory growth and coverage.

When contract time has expired and all work under the contract has been completed except for the specified growth and coverage of vegetation, liquidated damages will not be charged provided the Engineer's diary documents that the following conditions have been met:

(a) The Contractor has complied with all instructions of the Engineer with regard to plant establishment, including but not limited to watering, replanting, mowing, and other work specified for plant establishment; and

(b) The work is deemed to be in a satisfactory state of maintenance, or every reasonable effort is being made to provide satisfactory maintenance.

When any of the conditions for waiver of liquidated damages have not been met, liquidated damages will be charged until the conditions are met or until release of maintenance, whichever occurs first.

Some contracts may require that planting of trees and shrubs or other plantings

be completed by a specified date because of seasonal requirements for their planting. In the event the Contractor fails to complete these plantings within the specified period and must wait until the next season, liquidated damages will be charged after the specified completion date until completion of all plantings as specified and all other work under the contract is completed, except when the Engineer attests that all other work is completed; all the work is in a satisfactory state of maintenance; and the only remaining work which can be performed under the contract is continued plant establishment, only one-seventh of the specified deductions for liquidated damages will be made.

SECTION 211 - TOPSOILING

211.01--Description. This work consists of furnishing if specified, excavating, stockpiling if necessary, transporting, spreading, compacting, and finishing topsoil as specified or directed.

211.02--Materials. The sources and provisions for use of topsoil from local pits located outside the right-of-way shall be as set forth in Section 106. Topsoil shall meet the applicable requirements of Subsection 715.01.

When indicated in the contract, topsoil shall be salvaged from within the construction limits. The topsoil shall be removed only from areas and to depths designated by the Engineer.

211.02.1--Materials Obtained from Right-of-Way. Areas from which topsoil is to be obtained shall be mowed and cleared of foreign materials to the satisfaction of the Engineer.

The approved area shall be excavated neither deeper than the limits of good topsoil nor deeper than necessary to produce sufficient volume to cover the designated areas.

If strata or seams of unsuitable material are encountered during the excavation of topsoil, the material shall be removed from the topsoil. If considered necessary, the area shall be abandoned and satisfactory material produced from other sources.

Topsoil shall either be transported and stockpiled on well drained areas approved by the Engineer, or transported, deposited, and processed directly on designated areas which have been finished, prepared, and approved to receive the topsoil. The Contractor shall spread or dispose of, as directed, all surplus material left in stockpiles without cost to the Department.

211.02.2--Materials Obtained Outside Right-of-Way. Before mining the material, approved areas shall be mowed and raked and cleared of foreign

materials to the satisfaction of the Engineer.

Approval of topsoil pits shall meet the requirements of Subsection 107.23.

It is intended that approved mining operations shall include the mixing or blending of materials that will insure a homogeneous mixture complying with the requirements of the contract.

For pits proposed by the Contractor, the Contractor shall obtain and submit for testing representative samples taken at places designated by and witnessed by the Engineer or the Engineer's representative. If deemed advisable, the Engineer may have Department forces take the samples, and the Contractor shall furnish the assistance required. Based on test results, the Engineer will approve lateral and depth limits of satisfactory materials.

At the Engineer's discretion, samples of the material may be taken at any point prior to spreading on the road. This sampling and testing will be for the purpose of determining whether or not corrective measures should be taken.

Material produced and approved as provided herein, will be accepted as meeting all requirements at the point of final loading for delivery and incorporation into the work.

Approved topsoil, mined as prescribed, shall be transported, deposited and processed directly into its final position on designated areas which have been finished, prepared, and approved unless temporary stockpiling is required or permitted by the Engineer. In case stockpiling is required or permitted, the Contractor shall spread or dispose of, as directed, surplus material left in the stockpile without cost to the Department.

211.03--Construction Requirements.

211.03.1--Conditioning of Areas to be Plated. The conditioning of areas to be plated will depend on the type of existing soil on cut slopes or fill slopes. Conditioning shall be performed so as to secure a bond between the existing soil and the topsoil. Unless otherwise directed, the area to be plated shall be shaped and dressed to the required line, grade, and typical section; disk-harrowed to a depth of at least two inches; and be reasonably free of large clods and stones exceeding three inches in diameter and other foreign materials before topsoil is deposited. On non-tillable slopes, the areas shall be shaped and dressed to the required section, and the Contractor shall cut trenches or furrows approximately six inches deep and approximately 24 to 36 inches apart, as directed by the Engineer dependent upon the steepness of the slope, and on approximate contours. Surplus material from trenching shall be uniformly spread over the area to be plated or otherwise disposed of in a satisfactory manner. In no case shall topsoil be placed on slopes until conditioning of the areas has been

approved.

211.03.2--Application. It is intended that the application of topsoil, the application and incorporation of fertilizer, and other erosion control work will constitute continuous construction, and the Contractor's operation shall be organized accordingly. When the Engineer has determined that the Contractor has made suitable arrangements to carry out these operations as indicated, topsoil shall be deposited on approved areas and spread to the required depth and section. When the required depth of plating material exceeds eight inches, it shall be placed in two or more approximately equal layers of no more than eight inches each.

Objectionable foreign material, large clods that cannot be broken down, and oversize stones shall be removed and the area dressed to present a uniform appearance.

211.03.3--Compaction. After spreading and shaping of the topsoil, compaction shall be performed to the degree that will provide a firm layer having a density of at least what might be expected from one complete coverage of a crawler type tractor track while the material is at a satisfactory moisture content.

211.03.4--Compacted Depth of Topsoil. Topsoil shall be deposited and spread in sufficient quantity so that when compacted it will have the depth specified in the contract.

Determination of depth will be made at random and recorded following compaction of each plated area of approximately 20,000 square feet and more often if determined by the Engineer to be necessary to control the specified depth. Each of the planted areas will be considered a lot. The depth of each lot checked will be the average of at least two and not more than four measurements taken within a square yard area. Except as provided in the following two paragraphs, the average depth of each lot shall not vary from the specified depth by more than one inch or 25 percent of the specified depth, whichever is larger. The average depth of the entire area topsoiled, or the average of the depths of individual lots, shall not vary from the specified depth by more than one inch.

Topsoil measured and paid for on a cubic yard basis may exceed the stated plus tolerances, provided the finished surface is uniform, does not obstruct drainage, and otherwise meets the approval of the Engineer; and further provided that in lieu of the Contractor removing the excess materials at no additional cost to the State, a reduction in pay quantity in the amount of the excess will be made. The excess in each lot will be computed by multiplying the depth in excess of the specified depth plus the tolerance by the area of the lot and the computed excess volume in cubic yards converted to loose vehicular measure by multiplying by 1.25.

Topsoil specified to be measured and paid for on a square yard basis may exceed the stated plus tolerance and remain in place provided the finished surface is uniform, does not obstruct drainage, and otherwise meets the approval of the Engineer. No additional payment will be made for the excessive material placed. The removal of excessive topsoil shall be at the election of the Contractor and at no additional cost to the State.

211.03.5--Topsoil for Plant Holes or Pits. When specified or ordered, topsoil shall be used for backfill material for plant holes or pits. Placement shall be in accordance with the applicable provisions of the specifications for the specified plantings.

211.03.6--Maintenance. The Contractor shall, at no additional cost to the State, preserve, protect, replace, and do other work necessary to maintain the topsoil in a satisfactory and acceptable condition from the time of placing until release of maintenance.

211.04--Method of Measurement. Contractor furnished topsoil will be measured by the cubic yard (LVM), at the point of delivery. For topsoil placed in excess of the specified depth, an adjustment in the measured quantity will be made in accordance with Subsection 211.03.4.

Topsoil specified to be obtained from sources within the right-of-way will be measured by the square yard of surface acceptably plated with topsoil.

Topsoil stripped from construction limits will also be included in the measurement of the applicable excavation item as prescribed in Subsection 203.04.

Unless otherwise specified, measurement for haul of topsoil will not be made.

211.05--Basis of Payment. Topsoil for slope treatment and backfilling of plant holes or pits, measured as prescribed above, will be paid for at the contract unit price per cubic yard or per square yard which shall be full compensation for completing the work.

Payment will be made under:

211-A: Topsoil for Slope Treatment, From Right-of-Way - per square yard

211-B: Topsoil for Slope Treatment, Contractor Furnished - per cubic yard

211-C: Topsoil for Plant Holes, Contractor Furnished - per cubic yard

211-D: Topsoil for Plant Pits, Contractor Furnished - per cubic yard

SECTION 212 - GROUND PREPARATION

2l2.0l--Description. Ground preparation, light or standard as specified, consists of plowing, loosening, and pulverizing the soil to form suitable beds for erosion control items in accordance with these specifications and in reasonably close conformity with the established lines and grades without appreciable humps or depressions. When performing ground preparation on an area that has been previously planted with temporary grassing, the previously planted grasses shall be disked, tilled, plowed, etc. to assure that the existing temporary grasses are thoroughly mixed into the soil.

212.02--Blank.

212.03--Construction Requirements.

212.03.1--General. Equipment used shall be approved units suitable to perform the work and subject to the requirements of Subsection 108.05.

The Contractor shall take full advantage of weather and soil conditions, and no attempt shall be made to prepare soil when it is wet or in a condition which will not allow the soil to be properly tilled.

Light ground preparation will be required on designated areas where seeding is required to improve the coverage of partially vegetated areas.

Standard ground preparation will be required on areas designated to be solid sodded and areas with no vegetation designated to be seeded.

212.03.2--Light Ground Preparation. Light ground preparation shall consist of scratching the surface with a close-tooth harrow, disk-harrow, or similar equipment within 24 hours after application of required fertilizer. The depth of scratching shall be at least three-quarters inch but not deep enough to damage existing vegetation.

212.03.3--Standard Ground Preparation. Standard ground preparation shall consist of plowing or disk-harrowing and thoroughly pulverizing the areas immediately before the application of erosion control (vegetative) items. Unless otherwise specified, the pulverized and prepared seedbed shall be at least four inches deep and shall be reasonably free of large clods, earth balls, boulders, stumps, roots and other objectionable matter. Incorporation of fertilizer and ground preparation may be performed simultaneously.

Aerating, moistening, or otherwise bringing the soil to a suitable condition for ground preparation shall be considered as incidental to the work and will not be measured for separate payment.

Prepared areas will be inspected by the Engineer, and until approved, subsequent operations shall not be performed.

212.04--Method of Measurement. Ground preparation of the type specified will be measured by the square yard.

212.05--Basis of Payment. Ground preparation will be paid for at the contract unit price per square yard which shall be full compensation for completing the work.

Payment will be made under:

212-A: Light Ground Preparation	- per square yard
212-B: Standard Ground Preparation	- per square yard

SECTION 213 - FERTILIZING

213.01--Description. This work consists of furnishing, transporting, spreading, and incorporating fertilizers of the types and in the amounts designated.

213.02--Materials. Fertilizers for purposes of these specifications shall be understood to include standard manufactured products consisting of single or combination ingredients and agricultural limestone.

All fertilizer shall comply with the State Fertilizer Laws and the requirements of these specifications.

Fertilizers shall meet the requirements of Subsection 715.02. All fertilizer shall be handled so as to insure proper protection at all times. All fertilizers, except agricultural limestone, shall be furnished in standard bags. When approved by the Engineer, bulk fertilizer may be used. The Contractor shall provide means suitable to the Engineer for applying bulk fertilizer. The Engineer shall weigh shipments at random for verification of bulk fertilizer quantities.

213.03--Construction Requirements. The Contractor shall furnish all equipment necessary to properly handle, store, uniformly spread, and incorporate the specified application of fertilizer.

The type and rate of application of each fertilizer to be applied will be indicated on the plans or determined by soil tests. The amounts and types of fertilizers shall be applied uniformly on the areas to be planted or seeded and uniformly incorporated into the soil.

Fertilizers shall be applied on individual areas of not more than three acres. The

Engineer will determine the actual amounts of fertilizers to be applied on each area. For agricultural limestone, a tolerance of 15 percent will be permitted without correction. For all other types of fertilizer, a tolerance of 10 percent will be permitted without correction. Areas deficient in application by more than these tolerances shall be corrected by re-application in a manner approved by the Engineer. For areas on which fertilizer has been placed in excess of the tolerance permitted the amounts in excess of the tolerances will be deducted from the measured quantities.

All fertilizer shall be incorporated within 24 hours following spreading unless otherwise directed. Incorporation of fertilizer into soils other than topsoil shall include standard ground preparation in accordance with Subsection 212.03. When topsoil is used, the fertilizer shall be incorporated into the top three inches.

Unless otherwise specified, when fertilizer is to be applied to existing vegetation, incorporation shall be accomplished immediately after the application by mowing the vegetation to a height of approximately four inches.

213.04--Method of Measurement. Fertilizer of the type specified, applied as ordered in accepted work, will be measured by the ton. Fertilizer not applied and incorporated in accordance with these specifications and fertilizer applied in unacceptable work will be deducted from measured quantities.

The measured quantity of fertilizer failing to meet the guaranteed analysis, as set out in Subsection 715.02, will be adjusted in proportion to the guaranteed analysis and the actual analysis.

Mowing required during fertilization of existing vegetation will be measured and paid for under pay item 223-A, Mowing.

213.05--Basis of Payment. Agricultural limestone will be paid for at the contract unit price per ton. Types of fertilizer, combination and manufactured, specified to be placed prior to planting will be paid for at the contract unit price per ton. All fertilizers for additional applications based on soil tests will be paid for on the basis of the contract unit price per ton for super-phosphate (0-20-0) plus or minus the applicable amount from the following schedule. Prices paid shall be full compensation for furnishing fertilizer and completing the work.

Type of Fertilizer	Superphosphate Contract Unit Price	
15-10-10	plus	$25.00 per ton
6-8-8	minus	$10.00 per ton
18-46-0	plus	$130.00 per ton
12-24-12	plus	$60.00 per ton
8-24-24	plus	$60.00 per ton
0-20-20	plus	$20.00 per ton
13-13-13	plus	$30.00 per ton
Muriate of Potash (60%)	plus	$0.00 per ton
Ammonium Nitrate	plus	$40.00 per ton
Urea	plus	$70.00 per ton
Ureaform (38-0-0)	plus	$225.00 per ton
Ureaform (10-10-10)	plus	$90.00 per ton

Payment will be made under:

213-A: Agricultural Limestone - per ton

213-B: Combination Fertilizer, Type - per ton

213-C: Superphosphate - per ton

213-D: Ammonium Nitrate - per ton

SECTION 2l4 - SEEDING

214.01--Description. This work consists of furnishing the specified seeds and inoculants for legume seed, treating the legume seeds, and planting the seeds in a prepared and approved seedbed; covering the seeds and compacting the seedbed; and providing plant establishment on all areas seeded. All the work shall be in accordance with the plans and these specifications.

214.02--Materials. Seeds shall meet the requirements of Subsection 715.03, subject to the provisions of this subsection. The Contractor shall acquire seed from supplier registered with the Mississippi Department of Agriculture and Commerce.

Except for the germination test as referenced in Subsection 715.03, bags of seeds properly labeled or tagged according to law and indicating characteristics meeting or exceeding the requirements of these specifications will be acceptable for planting.

The Contractor shall provide adequate dry and otherwise protected and approved

storage facilities for seeds, and shall furnish access to the storage for sampling and for the Engineer to inventory stored seed and inspect the suitability of the storage facilities.

Seeds that have been sampled and tested by the Mississippi Department of Agriculture and Commerce shall be acceptable for planting provided (1) that prior to planting, the Contractor furnishes the Engineer two copies of test reports from the Mississippi Department of Agriculture and Commerce indicating that the seeds meet the germination requirements, (2) not more than nine months have elapsed, exclusive of the calendar month in which the test was completed, between the germination test data and the time of planting, and (3) the seeds were properly stored and handled.

Seeds that have not been sampled and tested by the Mississippi Department of Agriculture and Commerce and test reports furnished prior to planting shall be sampled and tested for germination requirements by the Department.

The Contractor may use pre-tested, or post-tested seeds under the conditions stated herein. For seeds to be pre-tested, approximately 35 days from the date of sampling will be required to obtain the test results.

When pre-tested seeds are planted, a minus tolerance of five percent of the specified germination percentage will be allowed without adjustment. Seeds failing to comply by more than five percent may be planted, provided the rate of seeding is increased by 100 percent of the deficiency with the same or approved seeds, without additional compensation.

The Engineer may permit the Contractor to plant post-tested seeds, provided the seeds are properly tagged and have indicated characteristics meeting the requirements of these specifications without applying tolerances. If the seeds are planted, the Contractor shall assume full responsibility for the specified percent germination of the seeds upon subsequent tests. Acceptance or re-sowing will be based on the results of the subsequent tests. A minus tolerance of five percent of the specified germination percentage will be allowed without adjustment. If the tests indicate a deficiency in excess of five percent; (1) the deficiency shall be corrected by immediately re-sowing an amount of seeds equal to 200 percent of the deficiency with the same or approved seeds without additional compensation, or (2) should it be determined, by inspection, that a sufficient number of seeds have germinated to produce satisfactory growth and coverage, the Engineer will deduct from measured quantities an amount of seeds equal to l00 percent of the deficiency. Otherwise, the area seeded will not be considered in reasonably close conformity with the requirements of these specifications.

214.03--Construction Requirements.

214.03.1--General. Prior to planting the seeds, topsoil when specified, ground

preparation, and fertilizing shall have been satisfactorily performed and the area approved by the Engineer.

Seeding may be required for temporary protection or for establishment of permanent ground cover. The plans will indicate temporary seeding.

The rates of application, kinds, and the planting dates of seeds shall be as set out in the vegetation schedule on the plans. The Engineer will determine the actual quantity of seeds to be applied on individual areas of not more than three acres.

Legume seeds shall be treated in accordance with Subsection 715.03.4 immediately before sowing. Seeds shall be uniformly sown over the entire area with approved mechanical seeders. Seeds of different sizes may necessitate separate sowing. Should legume seeds become dry, they shall be re-inoculated.

Seeding shall not be done during windy weather or when the ground is frozen, extremely wet, or in a condition which will not allow the soil to be properly tilled

All seeds shall be covered lightly with soil by raking, rolling, or other approved methods, and the area compacted with a cultipacker.

When specified, mulching shall be performed in accordance with the requirements of Section 215 as soon as practicable but no later than 24 hours after seeding unless weather conditions are such that mulch cannot be placed.

214.03.2--Plant Establishment.. The Contractor shall provide plant establishment on all areas seeded until release of maintenance.

Plant establishment shall be provided for a minimum period of 45 calendar days after completion of seeding. In the event satisfactory growth and coverage has not been attained by the end of the 45-day period, plant establishment shall be continued until the specified growth and coverage is provided for at least one kind of plant as referenced in Section 210. The Contractor shall perform plant establishment on all areas of temporary seeding until the Engineer determines that the temporary seeding has served its purpose.

Plant establishment shall consist of preserving, protecting, watering, reseeding, mowing, and other work necessary to keep the seeded areas in satisfactory condition.

Unless otherwise permitted, areas requiring reseeding shall be prepared and seeded and all other work performed in accordance with the requirements of the contract as if the reseeding was the initial seeding. The types and application rates of fertilizer will be determined by soil tests or otherwise established.

214.03.3--Growth and Coverage. It shall be the Contractor's responsibility to

provide satisfactory growth and coverage of grasses, legumes, or combination produced from the specified seeding.

Growth and coverage on seeded areas will be considered to be in reasonably close conformity with the intent of the contract when the type of vegetation specified, exclusive of that from seeds not expected to have germinated and shows growth at that time, has reached a point of maturity where stems or runners overlap adjacent similar growth in each direction over the entire area.

214.04--Method of Measurement. Seeding will be measured by the acre, or by the pound, as indicated in the contract.

Except as provided under Subsection 107.17, no measurement for payment will be made for any materials or work required under Subsections 214.03.2 and 214.03.3.

Watering for seeding will not be measured for separate payment.

214.05--Basis of Payment. Seeding, measured as prescribed above, will be paid for at the contract unit price per acre or per pound, as indicated, which price shall be full compensation for completing the work.

Payment will be made under:

214-A: Seeding, Kind - per acre or pound

214-B: Seeding, Seed Mixture , Designation - per acre

SECTION 215 - MULCHING

215.01--Description. This work consists of furnishing, transporting, placing, and anchoring vegetative mulch on slopes, shoulders, medians, and other designated areas.

215.02--Materials. The vegetative materials for mulch shall meet the requirements of Subsection 715.05.

It is intended that Type I Vegetative Materials shall be used when available. When it is determined by the Engineer that Type I Vegetative Material is not reasonably available, Type II Vegetative Material will be permitted as provided in Subsection 715.05, with the concurrence of the State Roadside Development Manager.

Bituminous material for mulch shall be Emulsified Asphalt, Grade SS-1, meeting the requirement of Subsection 702.07. Subject to satisfactory results being

obtained, this material will be accepted on a certification basis in accordance with Subsection 106.04.

215.03--Construction Requirements.

215.03.1--Equipment. Mulching equipment shall be capable of maintaining a constant air stream which will blow or eject controlled quantities of mulch in a uniform pattern. If asphalt is used, a jet or spray nozzle for applying uniform, controlled amounts of asphalt to the vegetative material as it is ejected shall be located at or near the discharge spout.

Mulch stabilizers shall consist of dull blades or disks without camber and approximately 20 inches in diameter. The disks shall be notched, shall be spaced at approximately 8-inch intervals, and shall be equipped with scrapers. The stabilizer shall weigh approximately 1000 to 1200 pounds, shall have a working width of no more than eight feet, and shall be equipped with a ballast compartment, so that when directed weight can be increased.

215.03.2--Placement of Vegetative Mulch. Mulching shall be placed uniformly on designated areas within 24 hours following seeding unless weather conditions are such that mulching cannot be performed. Placement shall begin on the windward side of areas and from tops of slopes. In its final position the mulch shall be loose enough to allow air to circulate but compact enough to partially shade the ground and reduce erosion.

The baled material shall be loosened and broken thoroughly before it is fed into the machine to avoid placement of unbroken clumps.

215.03.3--Rates of Application and Anchoring Mulch. The Engineer will designate the rate of application of vegetative mulch within the limits of one to two tons per acre. The mulch may be anchored by either the use of a mulch stabilizer or by tacking with bituminous material. If a mulch stabilizer is used, the mulch shall be punched into the soil for a minimum depth of one inch. If bituminous material is used, the rate of application shall be 150 gallons per acre.

Where steep slopes or other conditions are such that anchoring cannot be performed satisfactory with a mulch stabilizer, the Engineer will require the bituminous material be applied at the time or immediately following the mulch placement.

When mulch stabilizers are used, anchoring the mulch shall be performed along the contour of the ground surface.

As the work progresses, the Engineer will determine the actual rate of application of the vegetative mulch and the bituminous material, if used, on each area not to exceed three acres. For vegetative mulch, a tolerance of 15 percent will be

permitted without correction. For bituminous material, if used, a tolerance of 10 percent will be permitted without correction. Areas deficient in application by more than these amounts shall be corrected by reapplication in a manner approved by the Engineer. For areas on which vegetative material has been placed in excess of the tolerance permitted, that portion of the material placed in excess of the tolerance allowed will be deducted from the measured quantities. In the event an excess of vegetative material has been placed in a quantity deemed by the Engineer to be undesirable, the Contractor shall remove and replace all material placed on that area at no additional cost to the State.

215.03.4--Protection and Maintenance. The Contractor shall maintain and protect mulched areas until release of maintenance of the project. The Contractor shall take every precaution to prevent unnecessary foot and vehicular traffic and shall repair and restore immediately any displacement of mulch without extra compensation.

At appropriate times determined by the Engineer, the Contractor shall mow or otherwise remove or destroy all undesirable growth on all areas mulched to prevent competition with the desired plants and to prevent reseeding of undesirable growth. All mowing shall be a part of protection and maintenance.

215.04--Method of Measurement. Accepted quantities of vegetative material for mulch will be measured by the ton.

The weight for measurement will be the product of the number of bales acceptably placed and the average weight per bale as determined on approved scales provided by the Contractor.

Anchoring of vegetative mulch, whether by use of a mulch stabilizer or by application of bituminous material, will not be measured for separate payment. The cost of anchoring shall be absorbed in the prices bid for other items of work.

215.05--Basis of Payment. Vegetative material for mulch will be paid for at the contract unit price per ton and shall be full compensation for completing the work.

Payment will be made under:

215-A: Vegetative Materials for Mulch - per ton

SECTION 216 - SOLID SODDING

216.01--Description. This work consists of furnishing, transporting, and planting approved grass sod in accordance with the plans and these specifications. This work shall also include plant establishment as specified and

required to assure satisfactory growth of the solid sod.

216.02--Materials. Unless otherwise specified, solid sod shall be common bermuda, bahia, or other approved sod species and shall be live, fresh, growing grass, unless in the dormant season, with at least one and one-half inches of soil adhering firmly to the roots when placed. The sod shall be reasonably free from obnoxious weeds or other grasses, and shall not contain any matter deleterious to its growth, or which might affect its subsistence or hardiness when transplanted. The sod shall be in blocks at least eight inches by eight inches and reasonably free from ragged edges. All sod shall be harvested from areas where the topsoil is fertile, and the areas shall have been grazed or mowed sufficiently to form a dense turf. The area from which the solid sod is to be harvested shall be closely mowed, and raked if deemed necessary to remove excessive top growth and debris.

When a kind of solid sod is specified, the material shall be nursery grown, healthy, free from damage, and free from noxious weeds and grasses. The nursery grown sod shall be in blocks at least eight inches by eight inches by one inch and reasonably free of ragged edges.

All solid sod materials shall be approved by the Engineer prior to transplanting.

216.03--Construction Requirements.

216.03.1--Procuring and Handling Sod. Approved sod cutters shall be used for cutting the sod into strips or blocks. Care shall be exercised at all times to retain the native soil on the roots of the sod during the process of excavating, hauling, and planting.

The sod shall be transplanted within 24 hours after arriving on the project, unless it is stacked in a manner satisfactory to the Engineer. All sod in stacks shall be kept moist and protected from exposure to the wind and sun and from freezing.

In no event shall more than three days elapse between the cutting and planting of the sod without approval of the Engineer.

216.03.2--Grading of the Area to Receive Solid Sodding. Prior to ground preparation for solid sodding, all excavating, shaping, and dressing shall have been completed in such a manner that the foundation for the sod has the proper cross section, line, and grade and so that the sod after placement will be flush with or slightly below the adjacent final ground line.

216.03.3--Ground Preparation and Fertilizing. After the area has been graded as required, the specified types and quantities of fertilizers shall be uniformly spread and then incorporated by standard ground preparation in accordance with Section 212. The prepared area shall be at an approved moisture content and

shall present a smooth, uniform surface with reasonably close conformity to the specified line, grade, and cross section. After approval by the Engineer of the prepared and fertilized area, sodding shall follow immediately.

216.03.4--Planting Sod. The sod shall be placed on the prepared surface with edges in close contact and starting at the lowest point and working upward. Cracks between blocks of sod shall be filled with small pieces of fresh sod, and all cracks too small for sod shall be filled by a light dressing of approved soil. The entire sodded area shall then be compacted and watered to the satisfaction of the Engineer. Light rollers, hand tamps, or other approved equipment shall be used for compacting.

On areas which the Engineer deems that the sodding might slide due to the height and slope of the surface or nature of the soil, the sod shall be "pegged" with wooden pegs driven through the sod blocks into firm earth. Pegs shall be at intervals deemed suitable to hold the sod in place.

216.03.5--Limitations. Solid sodding shall be performed only when weather and soil conditions are deemed by the Engineer to be suitable for proper placement.

216.03.6--Plant Establishment. Plant establishment shall consist of preserving, protecting, replacing, watering, mowing, and other work necessary to keep the sod in a satisfactory condition at all times until final acceptance.

A satisfactory growth of solid sodding shall be understood to mean a healthy, living, and growing grass turf, unless in the dormant season, which has been planted on an approved prepared foundation and has been maintained in accordance with the requirements of these specifications.

216.04--Method of Measurement. Solid sodding will be measured by the square yard.

If solid sodding is required by the contract, or ordered by the Engineer, on a section graded under a previous contract, required excavation, exclusive of trenching out and fine grading, will be measured under the appropriate excavation item of the contract, or as extra work.

Fertilizer ordered and acceptably used will be measured and paid for as prescribed in Subsection 213.04.

Standard ground preparation will be measured and paid for as prescribed in Subsection 212.04.

Water ordered will be measured and paid for as prescribed in Subsection 219.04.

216.05--Basis of Payment. Solid sodding will be paid for at the contract unit

price per square yard and shall be full compensation for completing the work.

Payment will be made under:

216-A: Solid Sodding - per square yard

216-B: Solid Sodding, Kind - per square yard

SECTION 217 - DITCH LINER

217.01--Description. This work consists of furnishing, placing, and maintaining a ditch liner of jute mesh, excelsior blanket, erosion control blanket or erosion control fabric on seeded, or other designated areas in accordance with the plans and specifications. Asphalt-coated fiber glass roving meeting the requirements of Section 218 may be substituted for ditch liner. Any substituted fiber glass roving will be measured by the square yard and paid at the contract bid price for ditch liner.

217.02--Materials. The type of material used for the ditch liner shall be at the option of the Contractor unless otherwise specified. Jute mesh, excelsior blanket, erosion control blanket and erosion control fabric shall meet the requirements of Subsection 715.09.

217.03--Construction Requirements.

217.03.1--General. The areas to be covered shall be prepared, fertilized, vegetated and left in a smooth uniform condition, free of stones, lumps, roots or other material which will prevent the ditch liner from being in contact with the underlying soil. Immediately following the planting operation, the ditch liner shall be installed by unrolling it in the direction of water flow and draping it loosely, without folds or stretching, so that continuous ground contact is maintained. The mulch material shall be omitted from areas receiving the ditch liner.

When two or more strips are required to cover a ditch area, the longitudinal laps shall be a minimum of four inches with the upgrade width on top. Transverse laps shall be a minimum of 12 inches with the upgrade section on top.

The end of the material at the beginning and ending of each area to be covered shall be folded and placed in a vertical anchor trench at least six inches deep, and stapled in the trench on six-inch centers, backfilled, and tamped. When directed, edges subject to scour shall be buried similarly. On the upgrade end, reinforce with a row of staples on six-inch centers about one foot below the anchor trench. All transverse laps shall be stapled on 12-inch centers and longitudinal laps on 36-inch centers. Each strip of material shall be stapled in three rows at the edges

and center with staples spaced not more than three feet longitudinally. The staples shall anchor the fabric netting. Check slots, a row of staples on 12-inch centers perpendicular to the flow line, shall be installed at 50-foot intervals.

On the downstream end of a ditch liner adjoining a structure, the anchor trench shall be omitted and the material folded under six inches and butted tightly against the structure and one row of staples installed on six-inch centers. An edge adjacent to a paved ditch shall be butted tightly against the paved ditch and a row of staples installed on 12-inch centers. All staples shall be driven flush with the soil surfaces.

Ditch liner materials used on areas other than ditches may be placed either horizontally or vertically. Adjacent strips of excelsior blanket material shall be butted tightly together and secured with a common row of staples rather than lapped as set forth for ditch installation. The staples shall be spaced on three-foot centers or less as determined by the Engineer based on field conditions. The excelsior blanket and erosion control blanket shall be placed with the fabric net facing up.

217.03.2--Protection and Maintenance. The Contractor shall maintain and protect the ditch liner until release of maintenance or until the Engineer has determined that the liner has served its useful life, whichever occurs first. Maintenance shall consist of repairs necessitated by erosion, wind, fire, or other cause.

217.04--Method of Measurement. Ditch liner will be measured by the square yard of surface area covered. Any over width of material installed wider than ordered, laps and anchor slots will not be measured for payment.

217.05--Basis of Payment. Ditch liner, measured as prescribed above, will be paid for at the contract unit price per square yard and shall be full compensation for completing the work.

Payment will be made under:

217-A: Ditch Liner - per square yard

SECTION 218 - BITUMINOUS TREATED ROVING

218.01--Description. This work consists of furnishing and installing a layer of bituminous treated roving to stabilize newly planted soil areas in ditches and on slopes in accordance with these specifications and at locations shown on the plans or as directed by the Engineer.

218.02--Materials.

218.02.1--General. The type of roving material, fiberglass or polypropylene, shall be at the option of the Contractor unless otherwise specified and shall meet the applicable requirements of Subsection 715.09.6.

The glass fibers or fibrillated polypropylene yarn shall be wound onto cylindrical packages so that the roving can be continuously fed through an ejector driven by compressed air and expanded into a mat. The fibers or yarn shall be lightly bound together in a ribbon form, without the use of clay, starch, or other deleterious substances. The material shall not contain petroleum solvents, or other agents known to be toxic to plant or animal life.

The roving material shall not be exposed to moisture prior to placement.

218.02.2--Bituminous Material. The bituminous material used for securing the roving to the existing soil shall be Emulsified Asphalt, Grade SS-1, meeting the requirements of Subsection 702.07.

218.03--Construction Requirements.

218.03.1--Equipment. An air compressor shall be used in conjunction with applying the glass fiber or polypropylene yarn. The compressor shall be capable of supplying 40 cubic feet of air per minute at a pressure of 80 to 100 pounds per square. An air gun specifically designed for spraying glass fibers or polypropylene yarn, sufficient 3/8-inch rubber hose for application, and at least one container shall be furnished for applying the material. Three spools or packages may be run simultaneously from a 125-cubic foot compressor. Equipment which cuts or breaks the roving will not be permitted. Equipment for applying the asphalt shall be capable of applying the material in a uniform spray at the rate specified.

218.03.2--General. The bituminous treated roving shall be applied over designated areas within 24 hours following the planting or seeding operations. The designated areas shall be free of all objects including the vegetative material for mulch that would keep the roving material from being in direct contact with soil throughout the entire area to be treated.

The upgrade and downgrade ends of the bituminous treated roving shall be buried in a six-inch minimum vertical slot and the soil tamped firmly against it.

The bituminous treated roving shall be applied uniformly over the planted areas at one of the following rate with a ±20% tolerance:

a) Bituminous Treated Fiberglass Roving ..... 0.50 pounds per square yard

b) Bituminous Treated Polypropylene Roving ..... 0.20 pounds per square yard

The rate of distribution will be determined from the number of spools or packages of roving used on each area and the average weight of the spools or packages. A sample of at least five spools or packages designated at random by the Engineer will be taken and weighed and the average weight to the nearest pound per spool or package will be used for the truckload from which the sample was taken.

Immediately following the spreading of roving, the asphaltic material shall be applied uniformly over the roving at the rate of 0.50 gallons per square yard with a ±20% tolerance.

The Contractor shall be required to apply additional asphaltic material, if needed, to penetrate through the roving in sufficient quantity to secure the roving to the soil.

218.03.3--Protection and Maintenance. The Contractor shall maintain and protect the bituminous treated roving mat until release of maintenance or until the Engineer has determined that the mat has served its useful life, whichever occurs first. Maintenance shall consist of repairs made necessary by erosion, wind, fire, or any other cause.

218.04--Method of Measurement. Bituminous treated roving will be measured by the square yard of surface area covered.

The additional materials required for terminal slots and materials placed outside the limits of the designated area(s) requiring treatment will not be measured for payment.

218.05--Basis of Payment. Bituminous treated roving, measured as prescribed above, will be paid for at the contract unit price per square yard, which shall be full compensation for completing the work.

Payment will be under:

218-A: Bituminous Treated Roving - per square yard

SECTION 219 - WATERING

219.01--Description. This work consists of furnishing, transporting, and applying water as specified during the planting operations and establishment of roadside vegetation excluding seeding. It shall be understood that watering will be measured and paid for only when ordered by the Engineer and used for items specified and when a pay item is included in the contract.

219.02--Materials. Water shall be as specified in Subsection 714.01.5.

219.03--Construction Requirements. Loading operations on the roadway resulting in water-logging or excessively wet basement soils, design soils, or base courses will not be permitted.

Water shall be applied in the manner and quantities, at the times, and for the purposes set forth in the contract or directed.

The quantities of watering shown in the contract are estimated for bidding purposes only and these quantities may be varied dependent upon need or may be omitted entirely with no adjustment in unit contract price.

The equipment furnished and used for this work shall be approved as adequate and suitable for the purpose used.

219.04--Method of Measurement. The quantity of water furnished and applied as directed or permitted will be measured to the nearest one thousand gallons (M gallons) by approved meters, measured tanks, or calibrated tanks.

In accordance with the intent of Subsection 109.01, the capacity of tanks may be made by weight and converted to one thousand gallons (M gallons) by dividing the weight in pounds by 8,330.

Water used by the Contractor in items of work not specifically authorized or directed by the Engineer or water wasted, improperly applied, or otherwise used for unauthorized purposes will not be measured for payment.

219.05--Basis of Payment. Water ordered or authorized, delivered, and applied will be paid for at the fixed contract unit price per one thousand gallons (M gallons) as pre-entered in the proposal and shall be full compensation for satisfactorily completing the work.

No change in payment will be made because of differential cost of watering from the fixed contract unit price. It is fully understood and agreed that any differential cost will be included in the price bid for other roadside development items.

Payment will be made under:

219-A: Watering - per M gallons

SECTION 220 - INSECT PEST CONTROL

220.01--Description. This work consists of furnishing and applying approved insecticides to control armyworms and other destructive insects that damage or destroy planted vegetation.

It shall be the Contractor's responsibility to continually observe the planted areas for insect damage, especially during the late summer and early fall. The Contractor shall, upon observing destructive insects, report it to the Engineer. If the Engineer or the Engineer's representative observes insect damage, the Contractor will be notified.

220.02--Materials. The Contractor shall select and furnish an effective insecticide produced by a reputable manufacturer in accordance with all Federal and State Laws and Regulations, and it shall meet the approval of the Engineer. The material shall be furnished in properly labeled containers. The Contractor shall be responsible for handling, storing and applying the material in accordance with the information shown on the label and complying with all Federal and State Laws and Regulations regarding its application and use. The Department will not be liable for violations in applying the material or damage caused by its use.

220.03--Construction Requirements.

220.03.1--General. The Engineer will determine the areas to be treated, and the Contractor shall immediately treat these areas unless weather conditions are unfavorable for proper treatment. The Contractor shall apply the approved insecticide at the rate and in the manner according to the requirements shown on the label of the container for the destructive pest being controlled. The equipment used in applying the material shall produce uniform coverage.

The Engineer will determine if satisfactory pest control was obtained on the treated areas. The Contractor shall reapply insecticides to areas where control is unsatisfactory at no additional cost to the State.

When the Engineer determines that pest control efforts were timely and correctly applied, the Contractor will be paid for any required re-grassing. If the Engineer determines that pest control efforts were unsatisfactory, the Contractor will re-grassing the area at no additional cost to the State.

220.03.2--Safeguards. In addition to the requirements specified in Subsection 220.02, safeguards in applying insecticides are the responsibility of the Contractor, and the Contractor shall be responsible for damage to the wildlife and human welfare.

The following are <u>minimum</u> basic safeguards to be observed:

(a) All insecticides shall be applied by approved ground equipment or approved aircraft mounted spray equipment. Aerial application shall be approved in writing by the Engineer.

(b) Personnel must be qualified to engage in this work.

(c) Personnel handling the insecticide and equipment operators must wear the recommended protective apparel.

(d) Avoid drift of insecticide on adjacent property.

(e) Do not contaminate streams, ponds or lakes.

(f) Some insecticides are highly toxic to bees. When application is to be near bee hives, provide a days advance notice to the beekeeper.

(g) Normally, insecticide application will be restricted to roadside areas which are under construction and not open to the public. Precautions for the protection of the public must be taken when treatment is ordered for rest areas, parks, etc.; namely, by keeping pedestrians off the area until the insecticide is washed off the turf area or the insecticide deteriorates and is not harmful.

Application methods and rates shall be in accordance with the instructions shown on the label of the insecticide container.

220.03.3--Contract Quantities. The quantity for insect pest control is estimated for bidding purposes only and this quantity may be varied dependent upon actual need or omitted entirely.

220.04--Method of Measurement. Insect pest control of the area properly treated and accepted will be measured by the acre. The area shall be computed from measurements taken parallel to the surface of the treated area.

220.05--Basis of Payment. Insect pest control, measured as provided above, will be paid for at the fixed contract unit price per acre as pre-entered in the proposal and shall be full compensation for completing the work.

No change in payment will be made because of differential costs from the fixed contract unit price. It is fully understood and agreed that any differential cost will be included in the prices bid for other roadside development items.

Payment will be made under:

220-A: Insect Pest Control - per acre

SECTION 221 - PAVED DITCHES

221.01--Description. This work consists of constructing paved ditches of portland cement concrete or hot bituminous plant mix, as specified in the contract and constructed in accordance with the provisions and requirements of these

specifications, and in reasonably close conformity with the lines, grades, typical cross sections, and locations shown on the plans or established.

221.02--Materials.

221.02.1--Portland Cement Concrete Paved Ditches. The materials used in the construction of portland cement concrete paved ditches shall conform to the applicable provisions and requirements of Section 804.

221.02.2--Bituminous Paved Ditches. The materials used in the construction of bituminous paved ditches shall conform to the applicable requirements for hot bituminous mixtures as set out in Section 401.

221.02.3--Reinforcement. Reinforcement shall meet the requirements of Subsection 711.02.

221.03--Construction Requirements.

221.03.1--General. The foundation for paved ditches shall be formed by excavating to the required depth and dimensions below the prepared finished surface grade of the paved ditch.

The foundation shall be thoroughly compacted by hand tamping or other approved method. Soft, spongy, or other unsuitable material shall be removed as directed and replaced with suitable material thoroughly compacted in six inch layers.

The forms used in this construction may be wood or metal; shall have a depth equal to the prescribed edge thickness of the paved ditch; and shall be of sufficient strength to withstand the weight of the concrete or bituminous mixture and the pressure incidental to vibration or compaction without bulging or displacement. Forms shall be securely staked and braced.

Reinforcement, if specified, shall be placed in a manner that will insure its proper position in the paved ditch section after all concrete is placed.

221.03.2--Portland Cement Concrete Paved Ditches. Unless otherwise specified on the plans, the portland cement concrete paved ditches shall be constructed of Class "C" concrete, mixed and placed in accordance with the applicable requirements of Section 804, and cured in accordance with the requirements of Subsection 501.03.20 or by other approved methods. The limitations of mixing and placing shall conform to the requirements of Subsection 501.03.12.

A template mounted on the side forms shall be used in striking off and finishing the surface of the concrete to the required shape and dimensions. The entire unit

shall be constructed monolithic with smooth fillets or curves at all angles or breaks in flow lines. Concrete shall be placed beginning at the bottom of the slope and progressing upward. The finished exposed surface of portland cement concrete paved ditches shall be given a Class 6, Floated Surface Finish in conformity with the requirements of Subsection 804.03.19.

Expansion joints shall be constructed at the locations indicated on the plans or directed, and shall be of the specified materials and dimensions.

221.03.3--Bituminous Paved Ditches. Bituminous paved ditches shall be constructed using a hot mix asphalt (HMA) mixture. The mixture shall meet job-mix requirements for the particular mixture used except the percent of asphalt cement designated in the job-mix formula may be increased by the Engineer by no more than two percent.

The mixture shall be spread, raked, finished, and compacted by hand tools or other satisfactory methods while at the proper temperature to form a smooth, stable, and impermeable lining.

221.03.4--Backfilling and Cleaning Up. After the concrete has set sufficiently or after the hot mix asphalt has been compacted to the required shape and dimensions, the forms shall be removed and the spaces around the paved ditch shall be backfilled with approved material and thoroughly compacted without damage to the paved ditch. The adjacent ditch slopes shall be neatly trimmed to the required section, and all surplus material shall be disposed of as directed.

221.04--Method of Measurement. Portland cement concrete paved ditch will be measured in cubic yards.

Bituminous paved ditch will be measured by the ton of HMA material actually placed. No measurement for separate payment will be made for any additional asphalt cement required in the mix.

Excavation required for trenching and fine grading will not be measured for separate payment. Other required excavation will be measured for payment under the applicable excavation items.

221.05--Basis of Payment. Portland cement concrete paved ditch will be paid for at the contract unit price per cubic yard and shall be full compensation for completing the work.

Bituminous paved ditches will be paid for at the contract unit price per ton and shall be full compensation for completing the work.

Payment will be made under:

221-A: Portland Cement Concrete Paved Ditch - per cubic yard

221-B: Bituminous Paved Ditch - per ton

SECTION 223 -- MOWING

223.01--Description. When the contract includes a pay item for mowing and when the Engineer determines that mowing is necessary, the Contractor shall perform litter removal and mowing of noxious vegetation or excess growth as directed by the Engineer in accordance with the provisions contained herein. Mowing shall also be required, when necessary, for the safe and convenient passage of traffic, as required in Subsection 104.04, Maintenance of Traffic. The importance of public safety and workplace safety can not be overemphasized. Special attention is made to Subsections 107.06, 107.07 and 107.10 of the Standard Specifications.

Prior to mowing, the Contractor shall pick up and properly dispose of all trash and debris within the area to be mowed and along any adjacent roadway shoulders. Trash and debris picked up and piled or bagged on the roadside must be removed from the right-of-way by the close of the work day. Piles or bags will not be allowed to remain on the roadside overnight. All trash and debris is defined as all trash, debris, litter, junk, rubbish, paper, cardboard, glass, cans, styrofoam cups, discarded items, garbage, old tires, treads, etc. The Contractor will not be required to pick up such items as cigarette butts, tiny chips of grass or other small items not readily visible to the traveling public.

The Engineer will advise the Contractor when mowing will be needed. The Engineer has the right to eliminate completely or partially any mowing on the project. The Engineer will advise the Contractor of the area to be mowed and the time to begin the mowing operations. The Engineer may delay mowing of lespedezas or crimson clover until after these plants have gone to seed. Mowing may be delayed to retain and promote desirable wildflower growth.

Mowing will be to a height of not more than six (6) inches and will include trimming adjacent to culvert ends, guard rail, sign posts or other appurtenances. Trimming adjacent to objects inaccessible by mower shall be performed by hand mowers, weed-eaters, sling blades, or any acceptable means necessary to complete the work. Care shall be taken not to damage trees, plants, shrubs, delineators or other fixtures which are part of the facility. Any damages by the Contractor's operations to signs, delineators, other traffic control devices or other appurtenances shall be corrected immediately at no additional cost to the State.

The quantity of mowing will be affected by actual conditions which occur during construction and may be eliminated entirely at the direction of the Engineer.

223.02--Blank.

223.03--Construction Requirements.

223.03.1--General. The Contractor shall perform the work throughout the entire project on those areas directed by the Engineer. The Contractor shall take full advantage of weather and soil conditions, and no attempt shall be made to mow while the areas are deemed to be wet enough to cause damage to the soil or vegetation. Care shall be taken to use methods and mowers that will provide even, uniform mowed areas, and not damage adjacent vegetation and structures. Excessive clippings of sufficient magnitude to smother or retard grass growth shall be removed to allow growth of existing or new grass.

The Contractor shall begin mowing operations within two weeks after receipt of the Engineer's letter to begin mowing. If the Contractor fails to begin the work within that time period the Engineer shall notify the Contractor in writing that the work is not being prosecuted properly, and therefore, future progress payments may be withheld in accordance with Subsection 105.01 of the Standard Specifications.

223.03.2--Equipment. Equipment used for mowing operations shall be of sufficient size, type and condition to perform the work satisfactorily. Mowers may be rotary, flail, sickle or combination thereof as necessary to efficiently accomplish the work. Rotary mowers shall be equipped with safety chains or other devices to prevent flying stones, rocks, cans, etc. from striking persons or property. Change or adjustment of the equipment or operator may be required if at any time during the mowing operation, the Engineer determines that the equipment, or operators of the equipment, are not performing satisfactorily.

When required for the Contractor’s mowing operations, appropriate traffic control devices shall be installed in accordance with the MUTCD.

223.04--Method of Measurement. Mowing will be measured by the acre. Litter removal and any required traffic control devices will not be measured for separate payment, but will be included in the fixed contract price for mowing.

223.05--Basis of Payment. When ordered by the Engineer, mowing will be paid for at the fixed contract unit price per acre indicated in the bid schedule, which price shall be full compensation for removing and disposing of litter, all equipment, tools, labor, traffic control devices and incidentals necessary to complete the work.

Payment will be made under:

223-A: Mowing - per acre

SECTION 224 - SOIL REINFORCING MAT

224.01--Description. This work consists of furnishing, placing and maintaining a soil reinforcing mat on seeded or other designated areas in accordance with the requirements of the plans and these specifications.

224.02--Materials.

224.02.1--Preformed Permanent Mat. The soil reinforcing mat must be one from the Department's current "List of Approved Sources".

The Contractor will be permitted to furnish and install a multi-width mat with seams securely bonded by welding, stitching or other methods meeting the approval of the Engineer.

224.02.2--Stakes. Unless otherwise specified by the manufacturer of the soil reinforcing mat, stakes used to secure the mat shall be either:

1) sound 3/4-inch by 2 1/2-inch by 15 inch minimum, triangular shaped, wood stakes,

2) 3/16-inch by 18-inch metal pins with 1 1/2-inch round metal washer, or

3) double prong "U" shaped wire staples made from 9-gauge or heavier steel wire with an approximate length of eight inches after bending.

224.02.3--Acceptance Procedure. Prior to use, the Contractor must furnish the Engineer three copies of the manufacturer's certification for each shipment of soil reinforcing mat material stating the number of rolls furnished and that the material in the shipment conforms to the same composition as that originally approved by the Department. When metal pins or wire staples are used, also furnish the Engineer three copies of a certification from the manufacturer or distributor stating the pin and washer size for metal pins or wire size for staples for each shipment.

The certifications by the manufacturer or distributor will be prima facie evidence of the materials meeting the requirements of the specifications.

224.03--Construction Requirements.

224.03.1--General. The area(s) to be covered shall be prepared, fertilized and vegetated as specified in accordance with the requirements of the contract before the mat is installed. The planted area shall be to finish grade, smooth, and free of stones, clods, or trash. The vegetative mulch material shall be omitted from areas receiving the mat. The mat shall be installed immediately following the planting operations.

The installation of the mat material shall be performed in accordance with the requirements specified herein and the installation detail sheet in the plans.

Terminal slots, both upstream and downstream, shall be excavated a minimum of twelve inches deep and two feet wide across the full width of each area to be treated before placing the mat.

Transverse check slots shall be excavated a minimum of nine inches deep and six inches wide across the full width of the area to be treated at approximately 25-foot intervals along the entire length of the area.

Outer edge slots shall be excavated four inches deep by six inches wide along the actual perimeter of the mat installation for the full length of the area to be treated.

When possible, the mat installation shall begin at the downstream end and unrolled uphill in continuous contact with the soil. When two or more widths of mat are required to cover an area, they shall overlap a minimum of three inches. In cases where rolls are to be spliced lengthwise, the ends of the rolls shall overlap three feet minimum with the upgrade strip on top.

Temporary staking shall be required to place tension on the mat at crest of check slot for securing mat into slot and for proper alignment during installation.

The mat material shall be secured across the full width of the mat with stakes one-foot apart in all terminal, downstream and upstream, and transverse check slots. The stakes shall be placed three feet apart, with the diagonal edge facing upstream when using wood stakes, on outer edge slots, longitudinal overlaps and bonded seams on multi-widths. For longitudinal overlaps, one stake shall serve the overlapped edges of adjoining strips. The center of each strip including each strip between each bond, if multi-width rolls are used, and the center of ditch bottom shall be staked at six-foot intervals with the stakes placed broadside to the stream flow. When the center of a strip or the longitudinal overlap, including a bonded seam, falls within six inches of the center of ditch, the required ditch bottom stakes may be omitted. Where the rolls of mat are spliced lengthwise, the three-foot overlap shall be staked with two rows of stakes 30 inches apart with the stakes spaced approximately 18 inches apart in each row.

Wood stakes shall be driven to within approximately two to three inches of the ground surface. When metal pins are used, they shall be firmly embedded in the underlying soil with the attached washers flush with the ground surface. When wire staples are used, they shall be driven flush with the ground surface.

After the mat is placed and staked into all slots, the slots shall be backfilled with soil and compacted to the satisfaction of the Engineer.

Consideration may be given by the Engineer to the use of alternate staking

procedures when submitted by the Contractor upon recommendation of the manufacturer of the soil reinforcing mat and at least seven days prior to the proposed installation of the mat.

224.03.2--Protection and Maintenance. The Contractor shall maintain and protect the soil reinforcing mat until release of maintenance. Maintenance shall consist of repairs made necessary by erosion, wind, or any other cause.

224.04--Method of Measurement. Soil reinforcing mat will be measured by the square yard of surface area covered.

The additional mat material required for overlaps, slots and overwidth of strips will not be measured for payment.

224.05--Basis of Payment. Soil reinforcing mat, measured as prescribed above, will be paid for at the contract unit price per square yard, which price shall be full compensation for completing the work.

Payment will be made under:

224-A: Soil Reinforcing Mat - per square yard

SECTION 225 - GRASSING

225.0l--Description. This work consists of furnishing, transporting, placing, plant establishment and all work necessary to produce a satisfactory and acceptable growth of grass. This work includes ground preparation, fertilizing, seeding and mulching necessary to establish a satisfactory growth of grass.

Ground preparation, light or standard, consists of plowing, loosening, and pulverizing the soil to form suitable beds for erosion control items in reasonably close conformity with the established lines and grades without appreciable humps or depressions. When grassing an area that has been previously planted with temporary grassing, a standard ground preparation will be required. The previously planted grasses shall be disked, tilled, plowed, etc. to assure that the existing temporary grasses are thoroughly mixed into the soil.

Fertilizing work consists of furnishing, transporting, spreading, and incorporating fertilizers.

Seeding consists of furnishing and planting seeds in a prepared seedbed; covering the seeds and compacting the seedbed; and providing plant establishment on all areas seeded. All the work shall be in accordance with the plans and these specifications.

Mulching consists of furnishing, transporting, placing, and anchoring vegetative mulch on slopes, shoulders, medians, and other designated areas.

225.02--Materials.

225.02.1--Fertilizers. Fertilizers for purposes of these specifications shall be understood to include standard manufactured products consisting of single or combination ingredients and agricultural limestone.

All fertilizer shall comply with the State fertilizer laws and the requirements of these specifications.

Fertilizers shall meet the requirements of Subsection 715.02.

225.02.2--Seeds. Seeds shall meet the requirements of Subsection 715.03, subject to the provisions herein. The Contractor shall acquire seed from persons registered with the Mississippi Department of Agriculture and Commerce.

Except for the germination requirements, bags of seeds properly labeled or tagged according to law and indicating characteristics meeting or exceeding the requirements of Subsection 715.03 will be acceptable for planting.

The Contractor should provide adequate dry storage facilities for seeds, and shall furnish access to the storage for sampling stored seed.

225.02.3--Mulching. The vegetative materials for mulch shall meet the requirements of Subsection 715.05.

Bituminous material for mulch shall be Emulsified Asphalt, Grade SS-1, meeting the requirement of Subsection 702.07.

225.03--Construction Requirements.

225.03.1--Ground Preparation.

225.03.1.1--General. Any equipment used for ground preparation shall be approved units suitable to perform the work and subject to the requirements of Subsection 108.05.

The Contractor shall take full advantage of weather and soil conditions, and no attempt shall be made to prepare soil when it is wet or in a condition which will not allow the soil to be properly tilled.

Light ground preparation should be used on areas where seeding is required to improve the coverage of partially vegetated areas.

Standard ground preparation should be used on areas designated to be solid sodded and unvegetated areas designated to be seeded.

225.03.1.2--Light Ground Preparation. Light ground preparation consists of scratching the surface with a close-tooth harrow, disk-harrow, or similar equipment. The depth of scratching should be at least three-quarters inch but not deep enough to damage existing grasses of the type being planted.

225.03.1.3--Standard Ground Preparation. Standard ground preparation consists of plowing or disk-harrowing and thoroughly pulverizing the areas immediately before the application of erosion control (vegetative) items. Unless otherwise specified, the pulverized and prepared seedbed should be at least four inches deep and shall be reasonably free of large clods, earthballs, boulders, stumps, roots and other objectionable matter. Incorporation of fertilizer and ground preparation may be performed simultaneously.

Aerating, moistening, or otherwise bringing the soil to a suitable condition for ground preparation shall be considered as incidental to the work and will not be measured for separate payment.

225.03.2--Fertilizing. The Contractor shall furnish all equipment necessary to properly handle, store, uniformly spread, and incorporate the specified application of fertilizer.

Unless otherwise specified in the contract, the Contractor shall incorporate bag fertilizer at a rate of 1000 pounds per acre of 13-13-13 commercial fertilizer. The equivalent rate of other type fertilizers will be allowed if the equivalent percentages of Nitrogen, Phosphorus and Potassium are obtained. The Contractor shall incorporate agricultural limestone at a rate of 5000 pounds per acre. Fertilization shall be applied uniformly on the areas to be planted or seeded and uniformly incorporated into the soil.

Fertilizers should be applied on individual areas of not more than three acres.

All fertilizer should be incorporated within 24 hours following spreading.

225.03.3--Seeding.

225.03.3.1--General. Prior to planting the seeds, ground preparation and fertilizing should have been satisfactorily performed.

Seeding may be required for temporary protection or for establishment of permanent ground cover. The plans will indicate temporary seeding.

The required type of seeds, minimum rates of application and planting dates of seeds are shown in the vegetation schedule on the plans. It is the Contractor's

responsibility to apply an ample amount of each type of seed to produce a satisfactory growth of grass and of the seed type required. At the completion of the project, a satisfactory growth of grass will be required. Reference Section 210 for satisfactory growth and coverage of dormant seed.

Legume seeds should be treated in accordance with Subsection 715.03.4 immediately before sowing. Seeds should be uniformly sown over the entire area with mechanical seeders. Seeds of different sizes may necessitate separate sowing. When legume seeds become dry, they should be re-inoculated.

Seeding should not be done during windy weather or when the ground is frozen, extremely wet, or in a condition which will not allow the soil to be properly tilled.

All seeds should be covered lightly with soil by raking, rolling, or other approved methods, and the area compacted with a cultipacker.

Mulching should be performed as soon as practicable.

225.03.3.2--Plant Establishment.. The Contractor should provide plant establishment on all areas seeded until release of maintenance.

Plant establishment should be provided for a minimum period of 45 calendar days after completion of seeding. In the event satisfactory growth and coverage has not been attained by the end of the 45-day period, plant establishment should be continued until a satisfactory growth and coverage is provided for at least one kind of plant as referenced in Section 210. The Contractor shall perform plant establishment on all areas of temporary seeding until the Engineer determines that the temporary seeding has served its purpose.

Plant establishment shall consist of preserving, protecting, watering, reseeding, mowing, and other work necessary to keep the seeded areas in satisfactory condition.

Areas requiring reseeding should be prepared and seeded and all other work performed as if the reseeding was the initial seeding. The types and application rates of fertilizer will be at the discretion of the Contractor.

225.03.3.3--Growth and Coverage. It shall be the Contractor's responsibility to provide satisfactory growth and coverage of grasses, legumes, or combination produced from the specified seeding.

Growth and coverage on seeded areas will be considered to be in reasonably close conformity with the intent of the contract when the type of vegetation specified, exclusive of that from seeds not expected to have germinated and

shows growth at that time, has reached a point of maturity where stems or runners overlap adjacent similar growth in each direction over the entire area.

225.03.4--Mulching.

225.03.4.1--Equipment. Mulching equipment should be capable of maintaining a constant air stream which will blow or eject controlled quantities of mulch in a uniform pattern. If asphalt is used, a jet or spray nozzle for applying uniform, controlled amounts of asphalt to the vegetative material as it is ejected should be located at or near the discharge spout.

Mulch stabilizers should consist of dull blades or disks without camber and approximately 20 inches in diameter. The disks should be notched, should be spaced at approximately 8-inch intervals, and should be equipped with scrapers. The stabilizer should weigh approximately 1000 to 1200 pounds, should have a working width of no more than eight feet, and should be equipped with a ballast compartment, so that weight can be increased.

225.03.4.2--Placement of Vegetative Mulch. Mulching should be placed uniformly on designated areas within 24 hours following seeding unless weather conditions are such that mulching cannot be performed. Placement should begin on the windward side of areas and from tops of slopes. In its final position, the mulch should be loose enough to allow air to circulate but compact enough to partially shade the ground and reduce erosion.

The baled material should be loosened and broken thoroughly before it is fed into the machine to avoid placement of unbroken clumps.

225.03.4.3--Rates of Application and Anchoring Mulch. The Contractor will designate the rate of application of vegetative mulch. The mulch should be anchored by either the use of a mulch stabilizer or by tacking with bituminous material. If a mulch stabilizer is used, the mulch should be punched into the soil for a minimum depth of one inch. If bituminous material is used, the rate of application should be 150 gallons per acre.

Where steep slopes or other conditions are such that anchoring cannot be performed satisfactory with a mulch stabilizer, the Contractor may elect to use bituminous material applied at the time or immediately following the mulch placement.

When mulch stabilizers are used, anchoring the mulch should be performed along the contour of the ground surface.

225.03.4.4--Protection and Maintenance. The Contractor should maintain and protect mulched areas until release of maintenance of the project. The Contractor should take every precaution to prevent unnecessary foot and vehicular traffic.

The Contractor should mow, remove or destroy any undesirable growth on all areas mulched as soon as any undesirable growth appears. This will prevent competition with the desired plants and to prevent reseeding of undesirable growth.

225.04--Method of Measurement. Grassing will be measured by the acre. Acceptance will be based on a satisfactory growth and coverage of seeds planted.

225.05--Basis of Payment. Grassing, measured as prescribed above, will be paid for at the contract unit price per acre, which will be full compensation for all required materials, equipment, labor, testing and all work necessary to establish a satisfactory growth of grass.

Payment will be made under:

225-A: Grassing - per acre

SECTION 230 - TREE AND SHRUB PLANTING

230.01--Description. Tree and shrub planting consists of furnishing, delivering, planting and establishing trees and shrubs of the types, species, and sizes indicated in accordance with these specifications and in reasonably close conformity with the locations shown on the plans or directed.

230.02--Materials.

230.02.1--Quality of Plant Materials. Unless otherwise specified, all trees and shrubs shall be nursery grown stock, strong, healthy, clean, well grown, and free from damage, insects, diseases, or rodents. They shall be root pruned and typical of the species. They shall possess a healthy, normal, and fibrous root system of sufficient size to insure plant growth. The branch system shall be of normal development and reasonably free from broken terminal growth or other objectionable disfigurements. Trees shall have reasonably straight stems, shall be well branched and symmetrical in accordance with their natural habits of growth, and shall be approved by a representative of the Department.

230.02.2--Plant Names. All scientific and common plant names shall conform to the "Standardized Plant Names" of the American Committee on Horticulture sponsored by the American Association of Nurserymen (AAN), current at the time of invitation for bids. All plant materials used shall be true to names and legibly tagged with name and size of material. There shall be no substitution for the kinds or sizes specified except by prior approval in writing by the Engineer.

230.02.3--Grading Standards. Grading of plants shall conform to the specifications for horticulture standards as adopted by the AAN, and current at

the time of invitation for bids.

230.02.4--Nursery Inspection and Plant Quarantine. All shipments of plants shall comply with all nursery inspection and plant quarantine regulations of the State of origin and destination, as well as with federal regulations governing the interstate movement of nursery stock. A valid copy of the certificate of inspection shall accompany each package, box, bale, or car load lot delivered.

230.02.5--Balled and Burlapped (B&B) Plants. Plants to be balled and burlapped shall be dug so as to retain as many fibrous roots as possible, and shall come from soil which will form a firm ball. The soil in the ball shall be the original and undisturbed soil in which the plant has been grown. The plant shall be dug, wrapped, transported, and handled so that the soil in the ball will not be loosened sufficiently to cause stripping of the small and fine feeder roots or to cause the soil to drop away from contact with the roots.

230.02.6--Container Grown (CG) Plants. Container grown plants shall be well-rooted and established in the containers in which they are sold. An established container grown plant shall be a plant transplanted into a container and grown in that container sufficiently long for new fibrous roots to have developed so that the root mass will retain its shape and hold together when removed from the container. The container shall be sufficiently rigid to hold the ball shape protecting the root mass during shipping and handling.

230.02.7--Inspection. All plant materials are subject to inspection at any time during the life of the contract by an authorized representative of the Department. Inspections before or during planting operations, however, shall not be construed as final acceptance of the plants involved.

230.02.8--Paint or Tree Wound Dressing. Paint required for cut surfaces shall be an asphalt base paint prepared especially for tree surgery and shall be approved before being used.

230.02.9--Collected Stock. Whenever "collected" stock is specified in connection with a species or variety, the stock shall not be nursery grown, but shall have been grown under natural conditions at the location from which it is acquired. When approved, collected stock may be obtained from areas no longer under cultivation as nursery stock.

230.02.10--Wrapping Material. The wrapping material shall be approved tree trunk wrapping paper.

The tying material to be used in wrapping trees shall be jute twine or other tying materials approved by the Engineer.

230.02.11--Water. The water applied as specified herein shall meet the

requirements of Subsection 714.01.5.

230.02.12--Topsoil. Topsoil used for backfilling shall meet the requirements of Subsection 715.01.

230.02.13--Fertilizers. Fertilizers shall meet the requirements of Subsection 715.08.

230.02.14--Mulch. Mulch shall meet the requirements of Subsection 715.07.

230.03--Construction Requirements.

230.03.1--Collected Plants. The Contractor shall notify the Engineer at least 24 hours in advance of digging local plants. These plants shall meet the requirements of the contract.

230.03.2--Digging of Plants. All plants, nursery grown or collected, shall be dug with care and skill immediately before shipping. Care shall be taken to avoid all possible injury to the plants or loss or damage to the roots. Particular care shall be given to the fibrous roots. After plants are dug, their roots shall not be permitted to dry out. If necessary to prevent drying out, they shall be puddled immediately upon digging. Dug plants shall not be exposed to artificial heat or to freezing temperatures.

230.03.3--Care and Handling of Plants. Unless otherwise allowed by the Engineer, all plants with bare roots that are not planted within four hours after delivery to the project shall be "heeled-in" in a moist soil.

The roots of "B&B" plants and container grown plants that are not planted within four hours upon delivery shall be adequately protected by a covering of soil, sand, sawdust, etc. and kept moist.

All heeled-in plants shall be properly maintained by the Contractor until planted. When plants are delivered in boxes, wrapped bundles, or other forms of closed packages, the packages shall be opened immediately after delivery and the plants inspected and dampened if necessary. While plants with bare roots are being transported to and from heeling-in beds, or being distributed for planting, the roots shall be protected from drying out by means of wet canvas, burlap, straw or by other approved methods.

230.03.4--Seasonal Limitations. Trees and shrubs shall be planted during the period specified in the plans. When soil and weather conditions are adverse to proper planting, the planting operations shall be suspended.

230.03.5--Excavation of Plant Holes. Plant hole excavation shall be roughly cylindrical in shape with the sides approximately vertical. Plants shall be

centered in the holes with the trunk locations as shown on the plans. The soil on the sides and in the bottom shall be loosened by scarifying or other approved methods.

Holes for bare-root plants shall be at least six inches larger than the maximum root spread. Holes for B&B, and CG plants shall be large enough to allow at least six inches of backfill below and around the earth ball. When a tree spade is used, the plant hole and the earth ball shall be approximately equal in size.

230.03.6--Pruning. Before the plant is placed in the plant hole, bruised or broken parts of minor roots shall be cut off in a satisfactory manner.

The tops of all plants shall be properly pruned, either before or immediately after planting. Pruning shall consist of thinning out and/or heading back of stems and top branches as may be necessary according to generally accepted horticultural practices and according to the shape, size, and condition of the individual plant. All cut surfaces one inch or more in diameter shall be painted with an approved asphalt base tree paint.

230.03.7--Planting, Backfilling and Watering. The plant shall be placed in the prepared plant hole at the proper position in regard to depth, alignment, final grade of the surrounding ground, and vertical placement of the trunk, and this position shall be maintained during subsequent backfilling and water operations. Unless otherwise specified or directed, plants shall stand, at the time of completion of planting operations, at the same depth as they stood in the nursery, container or field.

230.03.7.1--Plants with Bare Roots. With the plant in its proper position, the plant hole shall be carefully filled to within one-half to two-thirds its capacity with topsoil. The topsoil shall be carefully placed, worked around the roots, and firmed so as to avoid bruising or breaking the roots. When this partial backfilling and firming has been completed, the soil in the plant hole shall be saturated with water.

The remainder of the topsoil backfill shall then be placed, firmed, and brought to an approved moisture content. The top few inches of soil may be allowed to remain loose.

When deemed necessary, water rings shall be constructed of suitable firmed earth six inches high to encompass the plant hole for the purpose of retaining water.

230.03.7.2--Balled and Burlapped Plants. The plant shall be handled by the ball and placed in the hole in such a manner that the soil will not be loosened from the roots. After the hole has been partially backfilled and the topsoil firmed under and around the ball, the burlap shall be cut away from the stem of the

plant. The hole shall then be saturated with water to the elevation of the top of the topsoil. Backfilling and firming shall then be completed in a manner to avoid loosening the soil of the root ball. Water shall then be applied as for bare root plants, and water rings shall be constructed as deemed necessary.

230.03.7.3--Container Grown Plants. Immediately prior to placing the plant in the hole, the container shall be removed so as not to disturb the ball of soil that contains the root system. The planting procedure shall be as specified above for balled and burlapped plants.

230.03.7.4--Tree Spade Plants. When specified or permitted, a tree spade may be used in digging plant holes and planting. This method of planting shall be in accordance with good horticultural practices meeting the approval of the Engineer.

230.03.8--Fertilizer. Fertilizer shall be the types and shall be applied at the rates and in the manner specified. The fertilizer shall be applied during backfilling operations in a manner that will insure proper placement of the fertilizer and avoid injury to the roots.

230.03.9--Mulching. Mulch shall be the types and shall be applied at the rates specified as a top layer on the backfilled plant hole.

230.03.10--Wrapping. The trunks of smooth-barked trees shall be wrapped with an approved material prepared especially for tree wrapping.

Wrapping shall begin two inches below the ground line and continue upward to the lower-most branches, and shall be firmly placed and securely fastened in a manner that will not injure the trunk of the tree.

230.03.11--Staking and Guying. All trees shall be staked or guyed at the time of planting.

Trees larger than two-inch caliper shall be guyed from at least three points with double strands of 12-gauge wire. Guy wires shall be anchored to 2-inch by 2-inch by 18-inch stakes driven to the extent that the top of the stake is at approximately three inches above the finish ground. Tie wires shall be securely fastened to the tree by means of a collar of rubber hose or other approved material. Guy wires shall be tightened and kept tight by twisting.

Trees, 2-inch and smaller caliper, may be guyed as specified above or staked with two stakes, 2-inch by 2-inch minimum, set 18 inches in the ground. The tree shall be midway between the stakes and held firmly in place by two strands of 12-gauge, soft wire enclosed in rubber hose or other approved covering. The wire shall then be nailed or stapled to the stakes to prevent slippage.

230.03.12--Surplus Excavation. Surplus excavated material from plant holes shall be disposed of by scattering or as directed. All debris and other objectionable material shall be removed from the site and the area cleaned up and left in neat condition.

230.03.13--Restoration of Plants. At the earliest possible time during the planting seasons, the Contractor shall replace at no additional cost to the Department all dead, damaged, or missing plants.

230.03.14--Plant Establishment.

230.03.14.1--General. The Contractor shall use good horticultural practices to keep all plants installed in a healthy condition until final inspection for release of maintenance.

230.03.14.2--Weed and Grass Control. The area around planted trees and shrubs shall be maintained reasonably free of weeds and grass within a minimum radius of two feet from each plant trunk or the entire plant pit or bed. Where practicable to effectively accomplish this work without removal of the mulch, removal will not be required. If it is necessary to remove the mulch to effectively accomplish this work, removal and replacement shall be performed at no additional cost to the Department. Weed and grass control shall be performed during the time intervals specified on the plans.

230.03.14.3-Watering. Water necessary to thoroughly wet the roots of all trees and shrubs shall be applied in accordance with the provisions shown on the plans.

230.03.14.4--Fertilization. Each tree or shrub shall be fertilized with the types of fertilizer, at the rates, and during the periods shown on the plans.

230.03.14.5--Mulching. Mulch material shall be repositioned, supplemented, or replaced as required during the period shown on the plans.

230.03.14.6--Pruning. All trees and shrubs shall be properly pruned with approved pruning shears. Pruning shall consist of removing all dead or diseased wood and new growth as necessary to maintain natural shape of the plants. Pruning shall be during the periods specified on the plans.

The Contractor's responsibility for plant establishment work will end on October 1 following the second growing season; however, the Contractor shall be fully responsible for protection, preservation, and maintenance of all plantings until final inspection for release of maintenance.

230.03.14.7--Inspection of Plants. Inspection of planted trees and shrubs will be made by the Engineer before the end of the first full growing season. On or about October 1, determinations will be made by the Engineer of the survival of

each size and type of plant. The Engineer will either require replacement of dead, defective, or missing plants, or not require replacement at certain locations.

230.03.14.8--Replacement of Plants. The Contractor may be directed by the Engineer to replace certain dead, defective, or missing plants. Replacement plants shall be made at the earliest practicable time during the planting season following the first growing season. All replacement plantings shall be in accordance with the requirements applicable to initial planting.

230.03.14.9--Non-Replacement of Plants. Certain plants found to be dead, defective, or missing may be ordered removed and not replaced if non-replacement would not adversely affect the planting design.

230.04--Method of Measurement. Trees and shrubs, in place, undamaged and healthy at the time of final inspection, will be measured per each for each species, size, and type specified.

Furnishing, installation, staking or guying, weed and grass control, pruning, removal of dead and defective trees and shrubs or missing trees and shrubs will not be measured for separate payment.

Topsoil used for backfilling initial plantings only will be measured and paid for under Section 211.

Fertilizer ordered and acceptably used will be measured and paid for under Section 232.

Mulch ordered and placed in accordance with the requirements of these specifications will be measured and paid for under Section 233.

Water ordered and acceptably used will be measured and paid for under Section 219.

Construction of water rings, haul and disposal of surplus or unsuitable excavation, and other plant establishment work required in the contract shall be considered incidental to tree or shrub planting and will not be measured for separate payment.

Measurement for payment will be made in the following sequence:

When all plants have been planted in accordance with the contract, 65 percent of the unit price will be allowed.

When the inspection of plants at the end of the first growing season (October 1) as set out in Subsection 230.03.14.7 determines that the survival rate exceeds 65 percent for one or more of the individual species, sizes and types,

the same percentage of the unit price will be allowed as the survival rate, but not to exceed 75 percent.

At the end of the second planting season and after all ordered replacement plants have been properly planted and the survival rate at the end of the first growing season was determined to exceed 75 percent for one or more of the individual species, sizes and types, the same percentage of the unit price will be allowed as the survival rate, but not to exceed 80 percent.

At the end of the second growing season, 90 percent of the unit price will be allowed for surviving trees and shrubs.

Upon release of maintenance, 100 percent of the unit price will be allowed for surviving trees and shrubs meeting the requirements of the contract.

230.05--Basis of Payment. Accepted quantities of trees and scrubs of the specified species, size, and type will be paid for at the contract unit price per each, which price shall be full compensation for completing the work.

Payment will be made under:

230-A: Shrub Planting, Designation - per each

230-B: Tree Planting, Designation - per each

SECTION 231 - TREE SEEDLING PLANTING

231.01--Description. Tree seedling consists of furnishing, delivering and planting tree seedlings of the species, type and size indicated, in accordance with these specifications and in reasonably close conformity with the locations shown on the plans or directed.

231.02--Materials.

231.02.01--Quality and Grading Standards. The seedlings shall be nursery grown and equal to the best quality produced by and graded according to the standards of the Mississippi State Forestry Commission, United States Forest Service, or American Association of Nurserymen (AAN).

231.02.2--Nursery Inspection and Plant Quarantine. All shipments of seedlings shall comply with all nursery inspection and plant quarantine regulations of the state of origin and destination, as well as with federal regulations governing the interstate movement of nursery stock. A valid copy of the certificate of inspection shall accompany each package, box, bale, or car load lot delivered.

231.02.3--Plant Names. All scientific and common plant names shall conform to the "Standardized Plant Names" of the American Committee on Horticulture sponsored by the AAN, current at the time of invitation for bids. All plant materials used shall be true to names and legibly tagged with name and size of material. There shall be no substitute for the kinds or sizes specified except by prior approval in writing by the Engineer.

231.02.4--Inspection. All seedlings are subject to inspection at any time during the life of the contract by an authorized representative of the Department. However, inspections before or during planting operations shall not be construed as final acceptance of the seedlings.

231.02.5--Fertilizer. Fertilizer(s) shall meet the applicable requirements of Section 213 or Section 232, as specified.

231.03--Construction Requirements.

231.03.1--Equipment. The furnished tools and equipment for digging plant holes, slits or trenches shall be adequate to perform the excavation to the proper size and depth such that twisted, balled, or "U" roots will not result. All equipment and tools shall meet the approval of the Engineer.

231.03.2--Seasonal Limitations. Seedlings shall be planted during the period specified on the plans. When soil and weather conditions are adverse to proper planting, the planting operations shall be suspended.

231.03.3--Care and Handling. All seedlings shall be planted within fourteen days after pick-up from the nursery. The seedlings shall be stored in a cool, damp, shady place and the roots kept moist at all times until planted. Seedlings allowed to dry out in route to planting site, in storage for daily planting or during handling by individual planters will be unacceptable for planting.

231.03.4--Spacing. The spacing of seedlings shall be as specified on the plans, or as directed by the Engineer.

231.03.5--Area Preparation. All existing vegetation within the area shall be mowed to a height of approximately four inches prior to planting the seedlings.

231.03.6--Planting. When planting seedlings using a dibble bar or mattock, the ground shall be cleared of vegetation approximately one square foot at the point of planting. One seedling per trash-free hole shall be planted in the center of the cleared area at the depth grown in the nursery; however, a tolerance of two inches low will be permitted for pine seedlings. All slits, holes, or trenches shall be closed and the soil packed firmly around the planted seedlings.

Mechanical seedling planters may be used to plant seedlings in relatively flat

areas suited to power equipment when approved. The planter shall clean a strip of an approved width and in an approved manner. One seedling shall be planted in the trash-free slit or trench at the depth grown in the nursery; however, a tolerance of two inches low will be permitted for pine seedlings. All plant slits or trenches shall be closed and the soil packed firmly around the planted seedling.

When the plant holes cannot be dug large enough for the seedling's root system using dibble bar, mattock or mechanical planter, other approved methods shall be used. In any case, roots of seedlings shall not be pruned or broken.

231.03.7--Restoration of Seedlings. At the earliest possible time during the planting seasons and at no additional cost to the Department, the Contractor shall replace all dead, damaged, or missing seedlings.

231.03.8--Application of Fertilizer. Fertilizer shall be the types and shall be applied at the rate and in the manner specified.

231.03.9--Inspection of Seedlings. Inspection of planted seedlings will be made by the Engineer before the end of the first full growing season. On or about October 1, determinations will be made by the Engineer of the survival of each species of seedling. The Engineer will divide the portion of the project on which each species of seedling is planted into lots as deemed necessary to represent segments of the work in which survival characteristics are similar. At the discretion of the Engineer, the percentage of survival of seedlings will be determined by sampling from each of the lots selected or the percentage of survival in any lot may be determined from the ratio of the actual count of seedlings within the lot at the time of the inspection to the total number of seedlings required to plant the lot in accordance with the spacing requirements of the contract.

In the determination of the percentage of survival sampling from areas planted, the Engineer will select at random, from within each lot selected, one or more increments, each of which shall be not less than one-tenth acre or ten percent of the area of the lot, whichever is smaller. The area of each increment selected within the lot will be measured and, if more than one increment is selected, their areas will be combined. The number of surviving seedlings within the selected increment(s) of the lot will be counted. The percentage of the survival of the lot will be established by dividing the combined count of surviving seedlings thus obtained by the total number of seedlings required for the combined areas of the increments when planted in accordance with the spacing requirements of the contract.

The survival percentage of each species for the project will be established by multiplying the survival percentage for each lot by the area of each such lot and dividing the sum of these products by the total area planted.

As determined during this inspection, the Engineer will either require replacement of dead, defective, or missing seedlings or not require replacement of such seedlings at certain locations.

231.03.10--Replacement or Non-Replacement of Seedlings.

231.03.10.1--Replacement. The Contractor may be directed by the Engineer to replace certain dead, defective, or missing seedlings. Replacements shall be made at the earliest practicable time during the planting season following the first growing season. All replacement plantings shall be in accordance with the requirements applicable to initial planting.

231.03.10.2--Non-Replacement. Certain seedlings found to be dead, defective, or missing may not be ordered replaced if non-replacement would not adversely affect the planting design.

231.04--Method of Measurement. Seedlings of the type specified, in place, undamaged, and healthy at the time of final inspection, will be measured per thousand seedlings.

At the discretion of the Engineer, the total number of acceptable seedlings in place at the time of final inspection will be determined by sampling from areas planted or by actual count of acceptable surviving seedlings. The Engineer will divide the portion of the project on which each species of seedlings is planted into lots as deemed necessary to represent areas of the work on which survival characteristics are similar. Within each such lot, in the case of determination by sampling, the Engineer will select at random one or more increments, each of which shall be not less than one-tenth acre or ten percent of area of the lot, whichever is smaller. The area of the lot will be determined and the area of each increment selected within the lot will be measured and, if more than one increment is selected within the lot, the areas of such increments will be combined. The number of acceptable surviving seedlings within the increment or increments, as the case may be, will be counted. The number of acceptable surviving seedlings within the increment or increments thus determined shall be multiplied by the ratio between the area of the lot and the area of the increment or increments, as the case may be, to give the total number of surviving seedlings in the lot.

In lieu of such determination by the specified sampling method, the Engineer may elect to determine the total number of acceptable surviving seedlings in place in any lot at the time of final inspection by actual count.

The number of acceptable seedlings of each species in place on the project at the time of final inspection shall be the summation of the number of acceptable surviving seedlings of each species determined for each lot.

Fertilizer(s) ordered and acceptably used will be measured and paid for under Section 213 or Section 232.

Measurement for payment will be made in the following sequence:

When all seedlings have been planted in accordance with the contract, 65 percent of the unit price will be allowed.

When the inspection of seedlings at the end of the first growing season (October 1) as set out in Subsection 231.03.9 determines that the survival rate exceed 65 percent for one or more of the individual species, sizes and types, the same percentage of the unit price will be allowed as the survival rate, but not to exceed 75 percent.

At the end of the second planting season and after all ordered replacement seedlings have been properly planted and the survival rate at the end of the first growing season was determined to exceed 75 percent for one or more of the individual species, sizes and types, the same percentage of the unit price will be allowed as the survival rate, but not to exceed 80 percent.

At the end of the second growing season, 90 percent of the unit price will be allowed for surviving seedlings, trees and shrubs.

Upon release of maintenance, 100 percent of the unit price will be allowed for surviving seedlings, trees and shrubs meeting the requirements of the contract.

231.05--Basis of Payment. Seedlings of the type specified, measured as provided above, will be paid for at the contract unit price per thousand, which price shall be full compensation for completing the work.

Payment will be made under:

231-A: Seedlings, Designation - per thousand

SECTION 232 - FERTILIZER FOR WOODY PLANT MATERIAL

232.01--Description. This work consists of furnishing, transporting, and placing fertilizer under or around the roots of trees, shrubs, liner plants, and other plant materials in accordance with the requirements shown on the plans and in these specifications.

232.02--Materials. The fertilizer for woody plant materials shall meet the requirements of Subsection 715.08.

232.03--Construction Requirements. Unless otherwise specified, the

Contractor will have the option of using fertilizer packets or tablets. A one-ounce packet is equivalent to four five-gram tablets; two ten-gram tablets; or one twenty-one-gram tablet. The required number and size of packets or tablets for each type of plant material will be specified on the plans.

When using packets, they shall be placed beneath the roots in the backfill material during the planting operation. Care shall be taken to insure that packets remain unopened and lie in a horizontal position.

When using tablets, the plant shall be positioned in the plant hole and backfilled no higher than halfway up the root ball. The specified number of tablets, designated on the plans or determined by the Engineer, shall be spaced approximately equal distances around and immediately adjacent to the root ball. The backfilling operation shall then be completed in accordance with the planting specifications.

232.04--Method of Measurement. Fertilizer for woody plant material will be measured by the thousand tablets or packets.

Fertilizer tablets, placed as specified and accepted, will be measured in place by the thousand tablets.

Fertilizer packets, placed as specified and accepted, will be measured in place by the thousand packets. In the event fertilizer tablets are substituted for fertilizer packets as provided in Subsection 232.03, the quantity of tablets placed and accepted will be converted to packets and included in the measurement for payment for fertilizer packets.

232.05--Basis of Payment. Fertilizer for woody plant material, measured as prescribed above, will be paid for at the contract unit price per thousand tablets or per thousand packets, as specified. Prices thus paid shall be full compensation for completing the work.

Payment will be made under:

232-A: Fertilizer for Woody Plant Material,
Designation , Size - per thousand

SECTION 233 - MULCH FOR WOODY PLANT MATERIAL

233.01--Description. This work consists of furnishing, transporting, placing, and maintaining the kinds of mulch specified in accordance with the requirements of these specifications and in reasonably close conformity with the dimensions and details shown on the plans or established.

233.02--Materials. The mulch for woody plant materials shall meet the applicable requirements of Subsection 715.07.

233.03--Construction Requirements.

233.03.1--General. All work shall conform to good horticultural practices.

233.03.2--Placement. The specified kinds of mulch shall be placed uniformly on designated areas within 24 hours following planting. The areas to be mulched shall be free of undesirable debris and weeds or grass. The mulch shall be placed to the specified depth by an approved method and in a manner that will present a neat uniform appearance. The mulch shall be kept within the designated areas without undue scattering. The areas to receive mulch and the rates of application will be shown on the plans or designated by the Engineer. The tolerances from the specified rates will be as determined by the Engineer to be reasonable.

233.03.3--Protection and Maintenance. The Contractor shall maintain and protect mulch areas until release of maintenance of the project. The Contractor shall take every precaution to prevent unnecessary foot and vehicular traffic on the mulched areas and shall repair and restore immediately all displacement of mulch without additional compensation.

233.04--Method of Measurement. Mulch for woody plant materials will be measured by the cubic yard or ton as specified herein.

Tree bark mulch will be measured by the cubic yard as packaged or baled. Unless the Engineer determines otherwise, the volume shown on the manufacturer's label or tag will be used to determine the volume. Aggregate mulch will be measured by the cubic yard (LVM). Straw mulch will be measured in tons. The weight for measurement will be the product of the number of bales of straw mulch acceptably placed and the average weight per bale as determined on approved scales provided by the Contractor.

233.05--Basis of Payment. Mulch of the kinds, types, or classes specified will be paid for at the contract unit price per cubic yard for tree bark mulch, per cubic yard (LVM) for aggregate mulch, and per ton for straw mulch, which prices thus paid shall be full compensation for completing the work.

Payment will be made under:

233-A: Tree Bark Mulch, Type	- per cubic yard
233-B: Aggregate Mulch	- per cubic yard
233-C: Straw Mulch, Class	- per ton

SECTION 234 - SILT FENCE

234.01--Description. This work consists of furnishing, constructing and maintaining a water permeable filter type fence for the purpose of removing suspended soil particles from the water passing through it in accordance with the requirements shown on the plans and these specifications. Fence measured and paid as temporary shall be removed.

It is understood that measurement and payment for silt fence will be made only when ordered and a pay item is included in the proposal. The quantities are estimated for bidding purposes only, and may be varied dependent upon actual conditions which occur during construction of the project.

234.02--Materials. Geotextile fabric, posts, staples and woven wire backing, when required, shall meet the requirements of Subsection 714.13.

234.03--Construction Requirements.

234.03.1--Placement of Fence. The silt fences shall be constructed at the locations shown on the plans or as directed by the Engineer.

All posts shall be installed so that no more than three feet of the post shall protrude above the ground. Extra post for bracing shall be installed as directed by the Engineer. The woven wire shall be securely fastened to the wood posts with staples. When metal posts are used, the wire shall be fastened to the post with wire or other approved means. The geotextile shall be attached to the wire fence by wire or other approved means. The bottom edge of the geotextile shall be buried six inches below ground surface to prevent undermining. When splicing of the geotextile is necessary, two posts shall be installed approximately 18 inches apart and each piece of geotextile shall be fastened to both posts.

The geotextile will be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, storage or installation.

Type II geotextile may be installed without the woven wire fence backing provided all of the following conditions are met:

(a) Post spacing is reduced to six feet or less.

(b) The geotextile has been approved by the Engineer and the manufacturer recommends its use without the woven wire backing.

(c) Fence posts shall be inclined toward the runoff source at an angle of not more than 20° from vertical.

(d) Geotextile shall be attached to the posts in such manner that purpose

intended is satisfied and maintained.

234.03.2--Maintenance and Removal. The Contractor shall maintain the silt fence and the geotextile shall be removed and replaced when deteriorated to such extent that it reduces the effectiveness of the silt fence. Excessive accumulations against the fence shall be removed and disposed of as directed by the Engineer.

Unless otherwise directed, all temporary silt fences shall be removed. Upon removal, the Contractor shall remove and dispose of any excess silt accumulations, dress the area to give a pleasing appearance and vegetate all bare areas in accordance with the contract requirements. The temporary fence materials will remain the property of the Contractor and may be used at other locations provided the materials are acceptable to the Engineer.

234.04--Method of Measurement. Silt fence will be measured by the linear foot.

234.05--Basis of Payment. Silt fence, measured as prescribed above, will be paid for at the contract unit price per linear foot which shall be full compensation for completing the work.

Payment will be made under:

234-A: Temporary Silt Fence	- per linear foot
234-B: Permanent Silt Fence	- per linear foot

SECTION 235 - TEMPORARY EROSION CHECK

235.01--Description. This work consists of furnishing, constructing and maintaining baled hay or straw erosion checks for the retention of soil along the toe of fill slopes, around inlets, swale areas, small ditches, sediment basins and other areas as directed by the Engineer in accordance with the requirements shown on the plans and these specifications. Also, the work includes removing and disposing of the erosion checks and silt accumulations as directed by the Engineer.

Measurement and payment for temporary erosion checks will be made only when ordered and a pay item is included in the bid schedule of the proposal. The quantity is estimated for bidding purposes only and will be dependent upon actual conditions which occur during construction of the project.

235.02--Materials. Approved Type I or II baled hay or straw material shall be rectangular in shape with a minimum length of 32 inches and shall meet the requirements of Subsection 715.05. The wooden stakes used in securing the

baled material in place shall be approximately 2 inches by 2 inches x 34 inches meeting the approval of the Engineer.

235.03--Construction Requirements.

235.03.1--General. The erosion checks shall be constructed at the locations and according to the requirements shown on the plans or as directed by the Engineer. Erosion checks required along the toe of fill slopes shall be constructed prior to grading operations at the site. For other locations, the erosion checks shall be constructed when directed by the Engineer.

The soil shall be excavated at least three inches in depth to embed the baled material. After securing in place, a sufficient quantity of the excavated material shall be placed around the erosion check and compacted to prevent undermining.

235.03.2--Maintenance and Removal. The Contractor shall maintain the erosion checks and remove and dispose of silt accumulations as directed by the Engineer.

When the erosion checks are no longer needed, they shall be removed and the Contractor shall dispose of silt accumulations and treat the disturbed areas in accordance with the contract requirements.

235.04--Method of Measurement. Erosion check will be measured per each by actual count of the total bales used in constructing, replacing and maintaining the erosion checks.

235.05--Basis of Payment. Erosion check, measured as prescribed above, will be paid for at the contract unit price per each and which shall be full compensation for completing, maintaining and removal of the erosion checks and the removal and disposal of silt accumulations.

Payment will be made under:

235-A: Temporary Erosion Check - per each

SECTION 236 - TEMPORARY SILT BASINS

236.01--Description. This work shall consist of excavation and satisfactory disposal of all materials excavated in the construction, clean out, and maintenance of silt basins. This work may also consist of maintenance and removal of existing silt basins constructed on previous projects.

The Contractor shall construct earth dikes and overflow spillways, furnish and install outfall pipe, perforated elbows, perforated risers, and trash racks in silt

basins where shown on the plans or as directed by the Engineer. The quantity of silt basins to be placed will be affected by the actual conditions which occur during the construction of the project.

It is understood that measurement and payment for silt basins will be made only when shown on the plans or ordered by the Engineer, and a pay item is included in the bid schedule of the proposal. The quantity is estimated for bidding purposes only and will be dependent upon actual needs during construction of the project.

236.02--Blank.

236.03-Construction Requirements.

236.03.1-General. The Contractor shall excavate silt basins to the dimensions and at the locations shown on the plans or as directed by the Engineer. The silt basins, new or existing, shall be cleaned out as frequently as necessary to have at least 50% of the basin capacity available at all times. The silt basins shall be completely cleaned out and the slopes shaped and dressed for seeding and mulching prior to completion of the project unless otherwise directed by the Engineer. Grassing shall be done in accordance with the provisions contained in the contract for the roadway and will not be measured as a separate item.

236.03.2--Maintenance and Removal. The silt basins shall be maintained so they will function properly until the Contractor is released from maintenance, all as determined by the Engineer.

All excavated materials shall be utilized in the construction of basins or roadway embankments except where otherwise directed by the Engineer. Materials not used shall be disposed of as directed by the Engineer.

Upon removal of a silt basin, the pipe, elbows, risers and trash racks may be used at other locations provided they are in condition acceptable to the Engineer. Pipe, elbows, risers and trash racks will become the property of the Department upon completion of the project.

236.04--Method of Measurement. Silt basin will be measured per each. Once a silt basin has been constructed, it shall be paid for at the unit price per each.

Maintenance and removal of existing silt basin will be measured per each. Once an existing silt basin has been cleaned out, it shall be paid for at the unit price per each. Additional clean outs or maintenance may need to be performed on that silt basin throughout the length of the project.

236.05--Basis of Payment. Silt basin will be paid for at the contract unit price per each, which price shall be full compensation for construction, maintaining,

removal unless noted otherwise, grassing and any other work required to make the basin function. Maintenance and removal of existing silt basin will be paid for at the contract unit price per each, which price shall be full compensation for maintaining, removal, grassing and any other work required to complete the work.
Payment will be made under:

236-A: Silt Basin, Type - per each

236-B: Maintenance and Removal of Existing Silt Basin * - per each
* Type may be specified

SECTION 239 - TEMPORARY SLOPE DRAINS

239.01--Description. This work consists of furnishing materials for, constructing and maintaining temporary slope drains, to include berms, pipe and riprap, as directed by the Engineer in accordance with the requirements shown on the plans and these specifications to control soil erosion and water pollution. Also, the work includes removing and disposing of the temporary slope drains.

This temporary erosion control provision shall be coordinated with the permanent erosion control features to assure economical, effective and continuous erosion control throughout the construction period.

Measurement and payment for temporary slope drains will be made only when a pay item is included in the bid schedule of the proposal. The quantity is estimated for bidding purposes only and may vary depending upon actual construction requirements.

239.02--Materials. The temporary shoulder berm may be constructed from embankment material.

The temporary pipe shall be 8-inch minimum diameter and leak proof.

The temporary riprap shall be hard, durable stones or broken concrete, angular in shape and shall be of sufficient size to prevent scour where installed.

239.03--Construction Requirements. Temporary slope drains shall be constructed at the intervals and locations designated or deemed appropriate by the Contractor and approved by the Engineer for channeling runoff waters down embankment slopes and according to the requirements shown on the plans.

Slope drains shall be adequately anchored to the slopes and their outlets constructed or placed to prevent erosion.

Berms may be constructed from embankment material using the heel of a motor grader, bulldozer blade or other approved equipment and compacted using the wheels or tracks of same equipment.

Riprap shall be placed in accordance with the plans where the pipe outlet location is subject to scour. The riprap may be end dumped.

Pipe shall be placed in accordance with the plans and extended as required to coincide with the height of embankment by the end of each work day.

Prior to the suspension of grading operations each day, the Contractor shall shape the earthwork in a manner that will direct storm water runoff to the temporary slope drain installations.

The temporary slope drains shall be operated and maintained by the Contractor in an acceptable functional condition until the slopes are protected with permanent erosion control measures.

When the temporary erosion and pollution control installations are no longer required, the Contractor shall remove and dispose of all materials and restore the areas by establishing growth and coverage of vegetative items as required for the remainder of the project.

239.04--Method of Measurement. Temporary slope drains will be measured by the linear foot of temporary pipe, which includes berms, riprap, and pipe including elbows or special sections. Measurement shall be along the line and grade of the pipe installation from end to end along the centerline of the pipe installed and accepted.

Temporary shoulder berms and temporary riprap will not be measured for separate payment. Their costs shall be included in the per linear foot price bid for temporary slope drains.

239.05--Basis of Payment. Temporary slope drains, measured as prescribed above, will be paid for at the contract unit price per linear foot, which price shall be full compensation for completing and maintaining the work and for the removal and disposal of, when no longer required, all items comprising the temporary slope drains.

Payment will be made under:

239-A: Temporary Slope Drains - per linear foot